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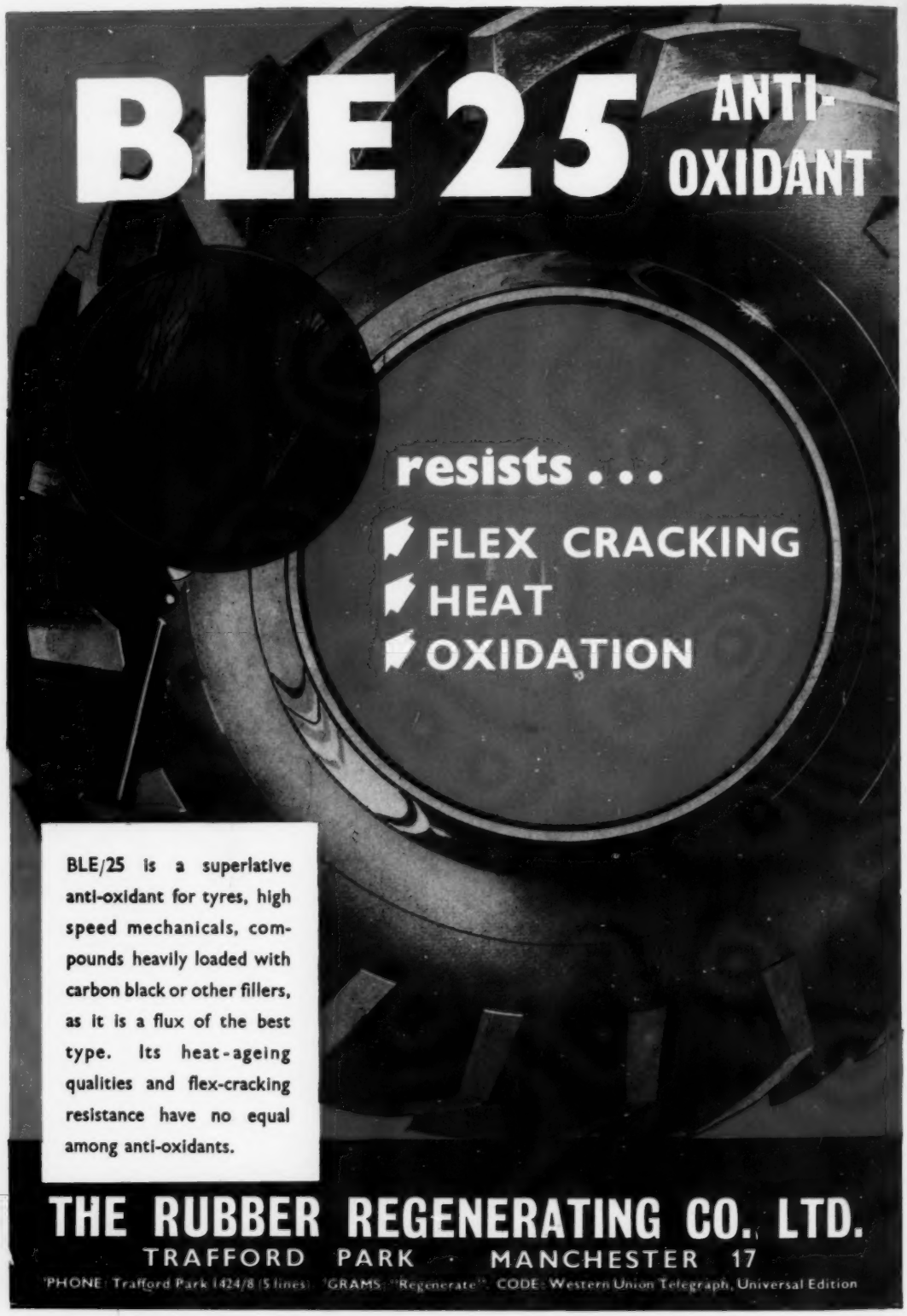
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IN ITS 75th YEAR

March 21 1959

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NOTES of the WEEK

Room for All

EXPANDED world synthetic production capacity may have the effect of stabilizing the natural rubber price according to a statement in the annual report of the Malayan Rubber Producers' Council. This was issued last week at about the same time as other similar reactions to Press reports on American commercial production of polyisoprene. It is widely agreed that the controlling factor in the use of such synthetics as Coral, Ameripol SN and polyisoprene will be price; a view that was also put forward by Dr John McGavack in an excellent article in the February *Rubber Age*. It certainly seems to come down to price, for polyisoprene, at least, appears to be identical in structure with natural rubber. Spectrographic analysis carried out by the British Rubber Producers' Research Association has shown that there is little or no difference. Taken in conjunction with the production of polyisoprene; the expanded world production capacity for other synthetic rubbers; the Malayan Government's avowed aim to open up a further million acres of virgin land to rubber and with other plans such as that for the production of millions of pounds of rubber from the guayule plant in Australia (reported last week in *RJIP* and referred to in this issue), together with such factors as the higher and higher yields that will be achieved on established and new plantations through replanting and stimulation techniques, and likewise such relative unknowns as Russia's progress with synthetic rubbers, world potential for the production of rubbers of all sorts looks like reaching a very handsome figure. However, all things considered, it would seem that in the years to come, demand for rubber will eventually increase beyond even the envisaged production capacity. As Dr McGavack said in his article, the old saying 'Go West' could be changed to 'Plant Rubber.'

Jobs

THE spread of automation, said a speaker at a meeting of industrialists the other day, does not at all mean that there *must* be an accompanying redundancy of labour. He went on to say that what actually happens 'is that a redundancy of *jobs* occurs: it is the particular operation that a man has been doing that can be dispensed with, not, in the overall picture, the man himself.' That seems to put the matter in the right perspective. If a community is developing, the word itself states that change is going on within it; no change, no life. So that to treat automation as a bad thing is to say that progress is a bad thing, too. Indeed, it may be said that to oppose redundancy is to court disaster, for by so doing the national effort to stand up to present-day world competition would be crippled. The important thing, in the speaker's view, was, as each new labour-saving device and process was adopted, putting some people out of work, to orient it as far as possible towards expanding the total national economy, which would mean the coming of new operations that would absorb the displaced labour.

And Leisure

OUT of all this, of course, is already rising a new problem; the problem of the use of leisure. If anything is inevitable, with the increase of automatic processes, it is that hours of work for the individual will continue to decrease. Which means that if unemployment is to be kept to a minimum there must either be larger scale production, *i.e.* more machines, more processes carried on in one shift or, alternatively, greater use made of machines and processes, *i.e.* multi-shift work. The one would mean the majority of the population working the same hours; the other, that hours of work would be spread right round the clock. A third alternative is for really short hours of work—something like a 20-hour week—so that a number of shifts would be worked in, say, a 12-hour day. Inherent in such conditions, of course, is greatly increased per head production, but that is the aim and effect of automation. Leisure is the problem and for long will remain so, perhaps because relatively few realize that it is a problem.

Fresh Start

ENCOURAGING in view of the vital importance of the problem is the news that the six common market countries are to make a fresh start in their attempt to reopen negotiations for a European Free Trade Area. Member Governments have been asked by the Common Market Commission to submit suggestions by April 15. These will then be considered by a special committee. It remains to be seen whether the new committee can produce a workable formula. For a successful outcome there must, it would seem, be a deal more 'giving' on all sides. It is now clear that real European economic integration, if it is to be lastingly established, must go very considerably further than was originally envisaged.

NEWS *Briefs*

HORSES LIKE RUBBER HURDLES—US PLASTICS FIRM EXPANDS—NO MORE NATURAL FOR USSR POLYISOPRENE OUTPUT—TERYLENE DECISION

●**United States** — The Seiberling Rubber Co. has announced that its plastics division—which began operations as a new venture in 1955—has outgrown its Newcomerstown, Ohio, plant and is to be expanded. Construction has already begun on a new plant addition that will provide 20,000 sq. ft. of new production space, laboratories and office area, and is scheduled for completion this spring.

●**Malaya**—Firestone Tire and Rubber Co. (S.S.) Ltd. will continue to buy increasing quantities of Malayan rubber, the managing director, Mr D. E. Clutter said on March 12. Mr Clutter said in a newspaper interview that despite the increasing uses of synthetic rubber, the Firestone organization was still using more natural than synthetic. He said in the past 40 years his company had bought three million tons of rubber from Malaya, at a cost of 5,400 million Straits dollars.

●**Mexico**—The new Director General of the Mexican oil monopoly (Pumex) said on March 11 that Mexico planned to go it alone as far as possible in building its own integrated petroleum industry. He added that Mexico would take outside help, and stated that negotiations were already under way with Phillips Petroleum Company for a carbon black plant.

●**United States** — Shell Chemical Company announced on March 11 that they are maintaining output of poly-isoprene synthetic rubber at an average five tons a day. Production capacity is expected to increase to an annual rate of 15,000 to 20,000 tons during this year. Price of this rubber is 30 cents per lb., fob Torrance, Calif., approximately equal to that for the better grades of natural.

●**United Kingdom** — The Terylene patents belonging to the Calico Printers' Association are to be extended for a period of five years from July 13 1958. This was announced in London on March 13 by the Assistant Comptroller of the Patents Division. The application by Calico Printers that its patents be prolonged on the grounds that it suffered loss and damage because of wartime conditions, was supported by I.C.I., which has a licence from CPA to exploit the patents in the UK. British Celanese, a subsidiary of Courtaulds, opposed the application.

●**Indonesia**—The Indonesian Government has decided to nationalize a further 227 Dutch-owned plantations in Indonesia, the Antara News Agency reported on March 14. The agency quoted 'reliable sources' as saying that 177 of the estates produced rubber or tea, or both. The entire nationalization question is expected to be dealt with by the government later this month.

●**United Kingdom** — The National Hunt Committee sponsored a trial of sponge rubber hurdles at Fontwell Park racecourse on March 16. Previous trials have been over only two flights but for this occasion all five flights in the hurdle races were used. Mr D. Hubbard, clerk of the course, said: 'It is almost certain that the trial of the new hurdles will be continued at the next meeting on April 6, after which a decision will be made as to whether the hurdles will be in permanent use.' Jockeys who rode over the hurdles said that they were a great improvement on the old style and were a pleasure to ride over, besides being better for the horses.

●**Indonesia**—Production of estate rubber in East Sumatra has dropped by 1,000 tons a month, or 15%, according to the Federation of Rubber Estate Managements in North Sumatra. Cause is ascribed to inadequate use of fertilizer, improper maintenance and rebel action.

●**Russia** — Mr Viktor Fedorov, deputy chairman of the Soviet Government Committee for Chemical Industry, has said in Moscow that the Soviet Union will stop importing natural rubber in the course of the next seven years, the Soviet news agency Tass reports. Addressing a congress of Soviet specialists in chemistry which has just opened in Moscow, he said Soviet production of synthetic rubber would increase 3.7 times during the next seven years, the agency adds.

●**Australia**—All Australia's synthetic rubber requirements for general purposes could now be supplied by the £7½ million plant of International Synthetic Rubber Company at Hythe, England, according to Mr H. J. Hornsby, the company's general sales manager. Mr Hornsby, who is on a three weeks' tour of Australia and New Zealand, said Australia spent nearly 17 million dollars on synthetic rubber from North America last year. His company's new plant would provide a sterling source of supply and help conserve hard currency.

'Here he comes—the unluckiest representative in the Rubber Industry.'—431

Some Aspects of Plastic Flow*

RHEOLOGY AND NEWTON'S IDEAS

INTRODUCING his subject, Dr Richardson said it was a matter of common knowledge that their fundamental ideas on the motion of fluids and of the resistance experienced by bodies exposed to a current of liquid or gas came from Newton. It was Newton who envisaged the flow over a solid boundary as being characterized by a gradient of velocity, the fluid in contact with the boundary being at rest, while successive 'layers' of fluid moved with faster and faster speeds until the speed of the free stream was attained. The fluid was thereby sheared in the same way that a slab of jelly was sheared if, while its lower surface adhered to a plate, the upper surface was pushed aside by the hand. The rate of shearing was proportional to this gradient of velocity but it also depended on the physical properties of the fluid.

Coefficient of Viscosity

Much later, this conception had been taken up by Poiseuille, who had used it to compare the behaviour of liquids when subjected to shearing forces during flow. It was to him and to Hagen that they owed the idea of a particular 'coefficient of viscosity' as the property of a fluid which related the shearing force to the gradient of velocity at the solid boundary which sets up the shear. Poiseuille sheared the liquid by making it pass through a narrow tube and relating the mean rate of flow through the tube to the dimensions of the tube and the viscosity of the liquid. In order to overcome the resistance of the tube to the passage of the liquid through it—and thereby to shear the liquid—pressure should be exerted to force the liquid through the tube.

In a liquid which obeyed Newton's law, increase of pressure or rate of shear on the liquid would increase the velocity gradient and so the rate at which the liquid passed through the tube *in the same proportion*. In other words the viscosity was a constant factor, unique for every 'Newtonian fluid' though it varied considerably from one fluid to another. A number of liquids and gases which were homogeneous (in the sense that they could not by any means detect that they have different properties in different parts or when viewed in different directions) did obey the simple laws of viscosity, but in recent years an increasing number of fluids had been found to have different coefficients of viscosity at different rates of shear. On examination, it proved that fluids with this abnormal behaviour—'non-Newtonian fluids' — were heterogeneous: for example, they could have particles of a different nature floating about in the body of the liquid (*sols*) or possess a structure binding the mass together in a semi-solid mass (*gels*).

It was interesting to reflect that Poiseuille himself did find such anomalous viscosity. He had been a physician interested in the mechanism by which the blood passed into the smaller vessels or capillaries and did some experiments with blood solutions forced through narrow tubes. (To this day they spoke of such tubes as 'capillary' tubes.) Blood was not a homogeneous liquid; it had corpuscles floating in it, though not in sufficient concentration to show much change of viscosity with rate of shear.

In a Newtonian fluid, the velocity varied in parabolic form across the section of a tube. Fig. 1*a*.

Fig. 1*b* showed how the velocity of flow of a markedly non-Newtonian liquid varied across a tube in which it was flowing. The velocity was nearly constant across the major portion of the tube and fell in a steep gradient to the walls. Hence, this type was known as plug flow. Although it was very difficult to measure the velocity from point to point across a narrow tube, it could be done if the liquid was contained in the space between two coaxial cylinders, one of which—usually the outer—was rotated while the other was held at rest. The liquid moved in a series of concentric rings and was sheared in the process.

If then they put a homogeneous liquid into the apparatus, the ratio of this twist to the speed of rotation of the outer cylinder was a constant, proportional to the coefficient of viscosity, but with a non-Newtonian liquid the torque increased rapidly at first (as the outer cylinder speeds up) and then moved more slowly so that the ratio torque (speed of rotation called the 'apparent viscosity') decreased as the rate of shear on the liquid increased. This was a common feature of these anomalous liquids and one of considerable technical importance.

Liquid Movement

A homogeneous liquid also had this property in accordance with Newton's law, that it began to move under the smallest possible shear. The smallest appreciable pressure drop along a tube or the smallest possible application of turning moment to the outer cylinder in the above apparatus was enough to start the liquid moving. When the concentration of the material in suspension in the liquid was high, when it formed, in fact, a fairly stiff paste, however, it was found that the substance would bear small shearing forces without starting to move.

The number and nature of the grains or corpuscles in the suspension had an important effect on its flow properties. If they were concentrated and tended to coagulate, it required an effort to get the suspension to move —one had first to break up the aggregates. Usually, if the suspension had fine grains among coarser ones, the fines 'lubricated' the suspension. It became more fluid and less plastic. Also, if the material in suspension consisted of needle or plate-shape bodies, these tended to align their

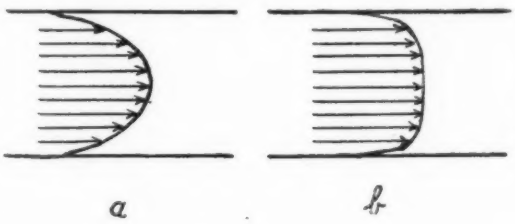

Fig. 1. Velocity distribution in flow: (a) Newtonian; (b) non-Newtonian. The lengths of the arrows represent the relative speeds

**Extracts from a paper entitled 'Rheology: The Science of Plastic Flow,' by E. G. Richardson, D.Sc., Professor of Acoustics and Reader in Physics, University of Durham. Delivered at the February 18 meeting of the Royal Society of Arts.*

longer dimension along the direction of flow once started, and the system moved readily.

The setting of a gelatine solution was an interesting case in which a liquid acquired internal structure by the reduction of its temperature and became a gel, possessing both yield value and elasticity. The latter factor was evidenced by the way in which jelly, partly displaced from equilibrium, 'shimmied' to and fro and eventually returns to equilibrium. The gel could be transformed back to the sol by heating or, sometimes, by shaking. A system which possessed gel-characteristics when left alone, but became (temporarily) a sol when disturbed, was said to be 'thixotropic.'

Finally, some liquids, particularly solutions of rubber in benzene, exhibited bulk elasticity. If a rubber solution was forced through a capillary tube, it was found that on emergence the liquid became swollen to a diameter greater than that of the tube. Evidently, under the influence of the pressure used to force it through the tube it had contracted laterally on entry and relieved itself of this constraint on leaving the tube. It was, doubtless, the cellular structure of rubber and dough which caused them to give way to comparatively small tensions.

Elasticity

The elasticity exhibited by liquids which climb up a rotating stick, linked them in behaviour with solids for it was primarily to a solid that they ascribed a proportional strain resulting from an applied stress (Hooke's law). In a true solid, however, this relationship was independent of time while an inviscid fluid was incapable of sustaining a strain unless it was contained in an hermetically-sealed vessel; but if a liquid possessed viscosity, had room to flow and was stressed, the stress would dissipate itself (by the movement of the fluid) at a rate which Clark Maxwell assumed to be proportional to the strain existing at any instant. Thus, on the application of the stress the comparatively large initial strain resulted in a rapid flow which decreased as the strain was relieved. The factor of proportionality was related to the time which the liquid took to relax, namely, to relieve itself of the stress applied to it. Maxwell had shown that this 'relaxation time' should be equal to the quotient of the coefficient of viscosity by the modulus of rigidity.

The speaker said they had written so far of those systems in which a solid was 'dissolved' either as a true solution (like rubber solution) or as a suspension (like clay in water). There was another class of non-Newtonian fluids in which both phases were fluid. These were the *emulsions* in which one liquid subsisted as globules in another forming the continuous phase, and the *foams* in which a gas was dispersed as bubbles in a liquid. Both required the presence of emulsifying agents (of which soap was a common instance) if they were to remain stable and not settle out into two discrete constituents, one above the other. The action of such agents was rather obscure but it was believed to be connected with the electrical sheaths with which it was able to surround the drops or bubbles. Whatever the consistency of such sols, whether definitely fluid like mayonnaise and bath foam or solid like margarine and chocolate sponge, these systems were of considerable technical importance. They all exhibited, in the concentric cylinder apparatus, a viscosity decreasing as the rate of shear increased. With the stiffer emulsions there was a critical velocity—something analogous to the yield value already referred to—below which the substance did not flow at all. Below this speed, the emulsion behaved as a solid, above it as a fluid with rapidly decreasing viscosity as the structure within it was broken down under stress.

If the globules were large enough, then when sheared by the general flow the liquid inside them could be set in rotation, a state of affairs which resulted in an increased rate of dissipation of energy into heat. In consequence, the viscosity was greater than it would be if the globules remained rigid spheres.

Universal Asbestos

PRODUCTION BEHIND DEMAND

IN his annual report, Mr Frank W. R. Douglas, chairman of the Universal Asbestos Manufacturing Co. Ltd., states that since the start of the current financial year, the group has received orders in such volume that, despite increased capacity, production in many cases remains behind demand. Production capacity for asbestos cement was to be increased at the Watford works and at the Fibrecrete factory at Chalford, Gloucestershire. Existing resources were sufficient to finance these developments. A new mechanized asbestos cement pipe plant was already being installed.

Allowing for the recently issued £260,000 convertible unsecured loan stock, total capital and consolidated reserves stood at £1,467,953 (£1,134,567). During the year to September 28 1958 some £110,000 was spent on new buildings, plant, etc. Group net profit for the year advanced from £84,309 to £151,933, and the ordinary dividend is raised from 17½% to 20%.

IRI Examinations

The IRI Diploma examinations will be held on the following dates: Associateship — week commencing June 15 1959: Licentiateship—June 8 and 9 1959.

Admission forms are available on application to the Secretary, IRI, 4 Kensington Palace Gardens, London, W.8. Closing date for applications, May 11 1959.

EUROPEAN DEMAND FOR RUBBER

The United States Natural Rubber Bureau in the February issue of its bulletin, *Natural Rubber News*, says that the total European demand for rubber products will expand in 1959 and subsequent years. American export trade in many rubber product lines will diminish as American investments in Western European manufacturing facilities rise.

The Bulletin notes that, since truck tyre business will expand proportionately more than other rubber product business, the demand for natural from Western Europe will increase in spite of much larger synthetic availabilities.

The Bureau add that total rubber consumption in the US is continuing at a high rate and an exceptionally good first quarter is in prospect. 'Something has to give. Either natural rubber imports must be stepped up considerably or the synthetic natural ratio must crack the 65-35% barrier for a time.'

Canadian Asphalt

Shipments of asphalt floor tiles from Canada in January to domestic and export markets declined to 1,634,594 sq. ft. from 2,061,267 a year ago, the domestic total falling to 1,632,344 sq. ft. from 2,051,817 and the export total to 2,250 sq. ft. from 9,450. Month's shipments of vinyl-asbestos floor tiles increased to 3,642,355 sq. ft. from 2,404,125, the home market receiving all deliveries.

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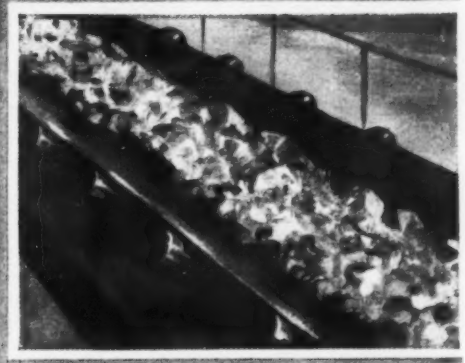

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Guayule Rubber

PLANS FOR LARGE AUSTRALIAN PLANTATIONS

WESTERN Australia may have large-scale guayule rubber plantations if the result of ground studies due to be started at the end of March by a group of American businessmen are successful. Plans (reported in *R/IP* last week) envisage 10,000 acre units each with a central factory capable of producing 10m. lb. of rubber annually.

Investigations of guayule were commenced in 1941 in South Australia under the joint supervision of the Council for Scientific and Industrial Research and the Waite Agricultural Research Institute as an emergency war project after the fall of Malaya.

Pioneer Efforts

Guayule (*Parthenium argentatum Gray*), is a shrub similar in appearance to sagebush and is native to north central Mexico and the adjacent part of Texas. Guayule rubber is by no means new to industry; in fact it has been an article of commerce for more than 50 years. Most of this rubber came from the wild shrub in Mexico before the Continental-Mexican Rubber Co., one of the pioneers in guayule rubber production, started exploratory cultivation. In 1912, operations were transferred to California and carried on by the American Rubber Producers Inc., of the Intercontinental Rubber Co. Accounts of their efforts to domesticate guayule were published by W. B. McCullum (Ind. Eng. Chem. 22, 384-87, 1930), the company's chief botanist, who did a great deal of the initial technical work. As early as 1928, reports were published (*India Rubber World*, Jan. 1928) of car tyres and tubes made from guayule rubber and successfully tested. During the last war, the US Department of Agriculture was responsible for growing and processing guayule and at one time operated 30,000 acres. Peak production was at an annual rate of 13,451,700lb. (*Rubber Journal*, September 7 1946) which compared to an average 6m. lb. by Intercontinental during 1938-39. Field experiments in the US are said to have shown that 100,000 to 400,000 shrubs per acre are practical under irrigation. Yields at the rate of 1,200 to 1,500lb. of milled rubber per acre have been produced in less than two years on such spaced, direct seeded plots.

The Australian experiments, described in a comprehensive bulletin issued by CSIRO in Melbourne in 1952, consisted of plantings in different areas with differing soil and climatic conditions, some under natural rainfall and some under irrigation. In 1948, when the project was approaching completion, five-year old guayule shrubs were forwarded to the Natural Rubber Research Station of the US Department of Agriculture at Salinas, California. In the official report from Salinas, the yield per acre comparisons between guayule grown in South Australia and at Salinas are of particular interest in view of the current plans mentioned above.

In the first place, there was a marked difference in the size of the Australian shrubs and the US shrubs milled at the same time as a control. Those from South Australia averaged 24in. in height; those from US averaged 17in. Defoliated average dry weight was respectively 3.29lb. and 0.80lb. On a defoliated dry weight basis, the Australian shrub had a 'resin' content of 8.99% and a rubber hydrocarbon content of 9.96%. Respective figures for the US shrubs were 7.88% resins and 12.7% rubber hydrocarbon. The chemist in charge at the US Department of Agriculture Station, Dr I. C. Feustal, further stated that, assuming the Australian shrub was planted on a 30in. x 30in. spacing (the Australian report quotes spacing as from 30in. to 36in.) and assuming 100% survival, the rubber hydrocarbon yield would be 2,259lb. per acre as compared to 1,077lb. per acre for the US shrub planted at 28in. x 20in. spacing. Dr Feustal added, '. . . even so, it appears that the Australian plantations will far outyield those of the Salinas Valley. This, of course, is attributable to the greater size of the plants rather than to the rubber content.'

Tyre Tests

Some of the uses of guayule rubber were detailed in the US House of Representatives early in 1952 (82nd Congress, 2nd Session, Proceedings. Vol. 98, Pt. 8. Appendix) when mention was made of experiments carried out by the US Synthetic Rubber Division on heavy duty truck tyres. Four different compositions were used for the tyre carcases, the treads in all cases being 'cold' synthetic rubber. The tyre carcases were described as being (a) 100% *Hevea*. (b) *Hevea* GR-S blend 55/45. (c) Guayule GR-S blend 55/45. (d) 100% Guayule. Three tyres, made by Firestone, were supplied for each carcase composition. The tests were abandoned at 50,900 miles at which point one each of the 100% guayule and the 100% *Hevea* were still running.

Periodical experiments made in efforts to determine whether guayule can be harvested, by annual clipping, rather than by total uprooting are reported to have shown that this is practicable. In some cases, about two-thirds as much rubber has been recovered by pollarding as by digging out the whole plant. The plants are said to show no detrimental effects and, of course, such a system eliminates the cost of replanting, besides which, second growth is available for harvesting sooner than a new plantation.

Among the references to guayule rubber which have appeared in the *Journal* are the following: January 25 1919, p. 164. September 27 1919, p. 561. March 5 1938, p. 298. March 12 1938, p. 320. February 1 1941, p. 84. November 22 1941, p. 412. November 29 1941, pp. 433, 437. December 6 1941, p. 459. December 13 1941, p. 479. December 27 1941, p. 518. February 14 1942, p. 644. July 4 1942, p. 254. January 9 1943, p. 32. May 29 1943, p. 502. June 12 1943, pp. 554, 556. October 9 1943, p. 360. May 20 1944, p. 575. September 9 1944, p. 289. September 16 1944, p. 317. January 6 1945, p. 16. August 11 1945, p. 164. September 7 1946, p. 312. April 26 1947, p. 530. October 21 1950, p. 662. January 27 1951. p. 149. July 21 1951, p. 118.

Plastics Technology

An evening course in 'Technology of Plastics' leading to the City and Guilds of London Institute Intermediate and Final Certificates is now being held by the Brooklands County Technical College, Weybridge.

If there is sufficient demand, the course could be organized on a day rather than evening basis. Further details may be obtained from the Head of the Department of Science, R. C. Rogers.

Mr R. F. Adams has been appointed a director of Patani Para Plantations. He fills the vacancy caused by the death of Mr H. S. Campbell.

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News for the rubber industry! Stearic Acid is now available in 'bead' form. Made by Price's for Columbian International, STEAREX beads possess unique advantages over other forms of Stearic Acid—at no increase in cost.

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Administration and Management

TECHNIQUES IN THE RUBBER AND PLASTICS INDUSTRIES

A NEW series of evening lectures entitled 'Some Aspects of Administration in the Rubber and Plastics Industries' has been begun at the National College of Rubber Technology. In his opening lecture, Mr B. L. Davies said that the series was intended for young men who aspired to positions of responsibility and authority in these industries. After reviewing the development of industry during the past 150 years, the speaker referred to the attention given to management studies during the past 50 years. The increasing pace of development of these studies was probably a contributory cause of the growth of Britain's trade from a linear increase of 1-1.5% during the latter part of the nineteenth century to the present rate of increase which was recently stated as 4.5% compound.

Requirements

It was sometimes contended that management could not be taught, but analysis showed that the requirements for management were (a) intelligence and personal qualities, (b) management knowledge and skill and (c) knowledge of the job. The first of these could not be taught but personal qualities could be developed by training. Management knowledge could certainly be taught and should precede the acquisition of skill in its application, which resulted from practice. Knowledge of the job could be acquired partly by technical training but this should be supplemented by contact with factory operations.

Management knowledge comprised background studies of economics, industrial history, psychology, with perhaps law and statistics, and also acquaintance with techniques such as work study, costing and estimating, industrial legislation and marketing. Some of the latter therefore formed the subject matter of lectures in this series.

The aim of all these studies was to maintain the profit motive which was the mainspring of industry, although modern management also recognized other duties and responsibilities, it was the duty of industry to conserve and use profitably the money invested in it so that further investment was encouraged, to provide fair wages, good working conditions and safety to employees of all grades, and to charge reasonable but not excessive prices to customers. In addition, as payers of taxes and rates, industrial undertakings had an interest in national and local government. Profit depended largely upon the accurate knowledge of costs. This accuracy rested, in turn, upon the careful use of work study.

Morale

Factories were operated by people and it was important to maintain a good 'climate' in industry. Over the years, not only had wage standards increased, but more pleasant environment and safer working conditions had become the rule, aided by legislative acts of which management had to take notice as legal obligations. People appreciated order rather than confusion and friendly human relations rather than friction and frustration. Inferior conditions of those kinds often led to high labour turnover which was costly, inconvenient, and was often regarded as a sign of inefficient management. Human relationships were associated with good organization, with adequate and effective communication between individuals both verbally and by written report, and with 'morale,' all of which would be discussed in this series.

As soon as authority was delegated, an organization was created. It could be defined as 'the arrangement of joint effort and the allocation of duties and responsibilities through which an undertaking works.' The modern type of organization, known as 'line and staff,' consisted of a line of disciplinary authority from the managing director to the machine operator or bench hand. Thus there could be no ambiguity or confusion of authority and responsibility, and working together as a team was encouraged. In addition, a variety of 'staff' specialists was available to assist management and administrators. Their function was to provide 'know-how' in their specialized field such as engineering, chemistry, industrial design, commerce or accountancy, without interference with the disciplinary authority of the 'line.'

Any individual, whatever his position in the organization, was called upon to act, and each act must be preceded by decisions as to what is to be done and how it was to be done. Thus, fundamentally, the difference between the senior manager and the junior supervisor was one of scope. Each made these decisions within the confines of his authority. In industry, the man who preferred the narrower scope was the specialist and the man who preferred the wide vista was the manager. It could be said that the former preferred things whereas the latter was interested in people.

Thus it could be concluded that those who had thoughts of management as a career should examine themselves closely on the question of whether they preferred to acquire a wide range of knowledge of people as well as things, or whether they were best fitted for deep study and the handling of detail. Both types were needed in industry and it was by no means a foregone conclusion that one was better paid than the other. Aspirants for management posts should first ensure their efficiency in their present job. Outstanding efficiency needed no advertisement. Secondly, they should interest themselves in a wider field in preparation for wider authority. They should learn the techniques of management and should have a real interest in their fellow men and should study human reactions to a variety of stimuli.

Stolen Rubber

George Henry Stone, a 53-year-old rubber dealer, of 12 Corporation Street, Islington, made a short appearance at Clerkenwell Magistrates' Court on March 12 and was further remanded until March 31 charged with stealing 15 tons of rubber worth £3,200, the property of Henry Sharpe and Sons on February 12 and alternatively with receiving the rubber, knowing it to have been stolen. Det.-Sgt. Reginald Grose said that another man would appear on that date charged with receiving the rubber.

Stone was remanded on his own bail of £1,000 and two sureties each of £1,000.

Plastics in New Cleaner

Plastics are well to the fore in a new vacuum cleaner, the Parnall 'tenten.' Some of the various tools such as the floor and wall brush are made from flexible vinyl while the others have protective vinyl bumpers. A new attachment employs three rows of polythene 'beads' which are vibrated by the suction to beat the carpet. Wheels on the very well-designed container are also of polythene. The 500-watt motor is rubber mounted and the 20ft. supply lead is rubber covered.

winged horse power . . .

WHEN Athena, goddess of war and patron of the arts, caught Pegasus and surrendered him to Bellerophon she may have had the Olympic Derby in mind. But Pegasus would have none of it. Bucking Mr. B out of the saddle, the winged horse resumed his flight to the heavens.

Similarly, aviation has overcome many obstacles in its remarkable progress through the skies, not without some material assistance from Dunlop.

Safety, comfort and efficiency have been built up by Dunlop aero tyres, disc brakes, anti-skid units, pneumatic actuating systems, de-icing units, windscreen wipers and the like. Dunlop, in fact, design and produce up to 400 items of equipment in the service of the aircraft industry, further evidence of the wide and varied resources of this world organisation.

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PVC Water Main

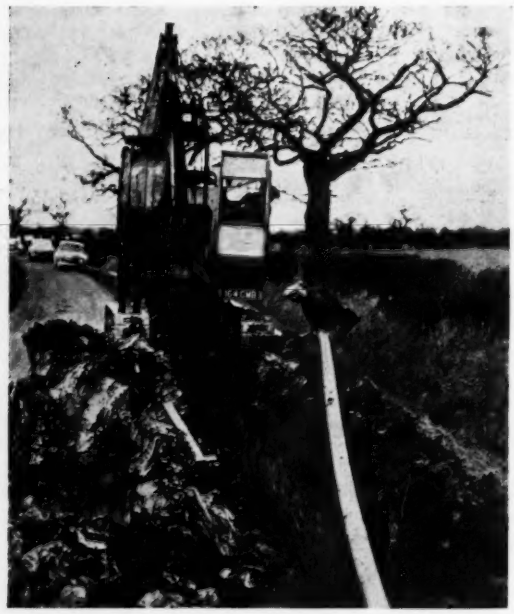
FIRST MAJOR INSTALLATION

THE first major installation in the North of England of rigid PVC underground water main has just been completed. This main, which was laid for the Mid and South East Cheshire Water Board, consists of over 10,000ft. of 4in. diameter Chemidus 2,000 pipe. The pipe was jointed on site using a special adhesive, and because of the light weight of the pipe, only three men were required for the installation which was completed at the rate of 1,500ft. per 8 hour working day.

The principal advantage of rigid PVC piping it its complete resistance to both internal and external corrosion, high-impact resistance, resilience, lightness and very low flow resistance.

Although rigid PVC has been in use for water mains for a long time on the Continent, Water Authorities in this country have been rather reluctant to use it. The Cheshire installation may therefore be regarded as a landmark in the history of the British water industry.

Chemidus 2,000 piping is made by Chemidus Plastics Ltd., 26 Progress Way, Croydon, Surrey, from a formulation containing Geon PVC.



Part of the 10,000 ft. of rigid PVC water main which was recently laid for the Mid and South East Cheshire Water Board. It consists of 4-in.-diameter Chemidus 2,000, which is made from a formulation containing Geon PVC, by Chemidus Plastics Ltd.

Fablothene Packaging

Sixty-gauge Fablothene film, made and printed by Anglo-American Plastics Ltd. (a member of the Commercial Plastics group of companies), from high clarity polythene compounds supplied by Bakelite, Ltd., is being used to sheath garments at the Bristol dry cleaning factory of Bollom Ltd., one of the largest dry cleaners in the United Kingdom. Bagging is done by an E-Z 'Twin Imperial' machine which cuts the film to the required length and heat seals it above the hanger supplied with each garment.

TYRE TESTING DEVICE

A dynamic testing device for rubber tyres has been built by the Manufacturing Enterprise for Research Equipment of the Hungarian Academy of Sciences, along the basic idea supplied by the chief engineer Dr József Farkas.

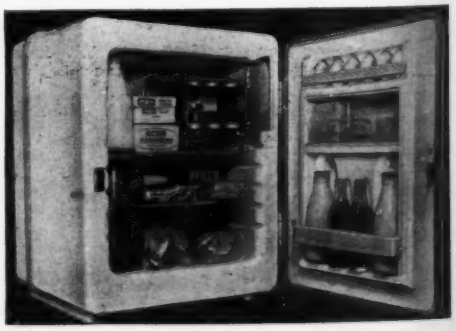
The apparatus, reported in the Hungarian Exporter, is suitable for the performance of reliable quality checks and durability tests on rubber tyres and inner tubes for bicycles or small motorcycles, products representing the most widely used mass-produced consumer goods. The road surface consists of a driving disc comprising three different zones. One zone represents a plane surface, the other a small asphalt or concrete road surface, while the third stands for a rough road surface. The tyre mounted for the testing can be run under a constant load adjustable according to the assumed weight of the passenger. The road surface can also be varied while running. Since tread wear is enhanced by slipping, this condition is also provided for by the apparatus. The speed of the tyres mounted to the testing device can be adjusted within a wide range by means of a simple external control mechanism.

An automatic electric cut-off switch is provided which can be adjusted to stop the machine as soon as the flattening of the tyre attains a value corresponding to the maximum permissible loss of air pressure within the tyre.

New Refrigerator

DOUBLE VACUUM FORMED

THE first refrigerator to be marketed under the 'Jackson' trade mark by the Electrical Division of Radiation Ltd., was on view in London recently and is being shown publicly at the current Ideal Home Exhibition.

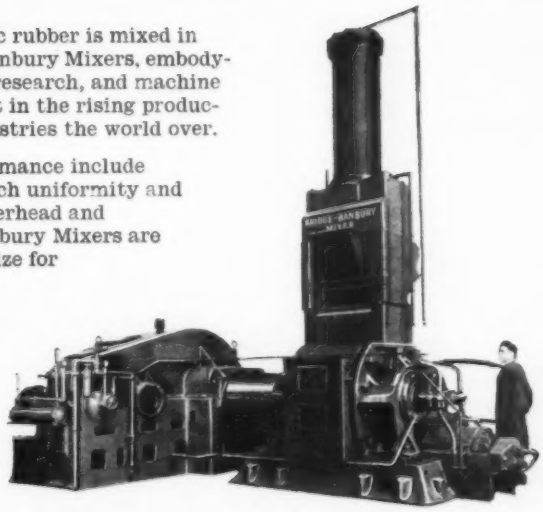


The construction of the refrigerator, which has a capacity of 2 cu. ft., is interesting in that the inner and outer cases are moulded in one complete piece. The material used is Astralon, a vinyl copolymer manufactured by Dynamit AG, Troisdorf, Germany, which has been especially developed for double vacuum forming. It is stated that it complies with the British Plastics Federation standards for use with food.

The refrigerator, in white inside and out, has a shelf area of 3.4 sq. ft. and the following overall dimensions: height, 26⅞in. (70.8cm.); width 21½in. (54.6cm.); depth, 22¾in. (57.8cm.); overall height on legs is 33½in. (85cm.). The door and join between the cabinet and the sheet metal covered cooling unit at the rear make use of vinyl trim.

No less than 85% of the world's natural and synthetic rubber is mixed in Banbury Mixers.* Small wonder then, that Bridge-Banbury Mixers, embodying more than a generation of practical experience, research, and machine design, continue to play an almost indispensible part in the rising productivity of the ever-expanding rubber and plastics industries the world over.

Indisputable claims for Bridge Banbury Mixer performance include optimum dispersion, speedier mixing, consistent batch uniformity and quality, increased production and a lower labour, overhead and maintenance cost per unit of production. Bridge Banbury Mixers are designed for round-the-clock operation. There is a size for every production requirement. Ancillary machinery matched to deal with the increased output and further streamline the production flow is available. **Bridge-Banbury Automation is continuous production.**



Fully detailed technical information is freely available on request.

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Minister Visits Microcell

INTEREST IN PLASTICS AND GLASS FIBRE

MR HAROLD WATKINSON, the Minister of Transport and Civil Aviation, paid an official visit to the Camberley and Blackwater factories of the Microcell group and associate companies on March 6. He took particular interest in the Plastics Division and also in the glass fibre producing plant of Glass Yarns and Deeside Fabrics Ltd.

In the course of his tour, Mr Watkinson said that international trade was of paramount importance to Britain. The maintenance and indeed the increase of the standard of living depended upon it. It was therefore most important that all their ingenuity and expertise should be employed to make their products as efficient and as attractive as possible to prospective purchasers. As they moved forward into the second half of the 20th century new industries would have to play an increasing part in strengthening export trade. They would have to replace and augment the efforts of other industries as times and demands changed.

New Industry

'Your company, with its products in the plastic and electronic fields and its work in glass fibres is pre-eminently the type of new industry on which we shall have to rely increasingly in the future to maintain our trading position. The products which are being shown to me today are very much the new type of products which we need to strengthen our position at home and abroad,' the Minister said.

He found the visit most interesting because the group of factories was producing, among other most necessary things, various products which were of direct benefit to industries in which he had a close concern and responsibility. They were producing aircraft seats for BOAC, computers for British Railways and glass fibre containers for ships' inflatable liferafts. 'I should like to refer to another of your products which comes into my sphere of responsibility for ships. The glass fibre container for inflatable liferafts is an important contribution which your company has made to safety. This country has indeed pioneered the use of such liferafts on merchant ships. These have already proved their value in many ways and are now standard equipment on a wide range of vessels. I should be glad to see them being used even more widely.'

Before they could be generally accepted on all seagoing ships, however, international agreement was necessary. It was hoped that there would be an opportunity to achieve this next year. A conference was to be held in London then to amend the International Safety Convention and they would like to see it agree to greater use of liferafts. Proper protection for these appliances on board ship would, however, be vital, and the glass fibre containers which were being produced were an undoubted improvement on previous methods. He had probably said enough, he continued, to show that the work there was making a great contribution to the trading and competitive position of Britain. It was the type of work which looked to the future and of which they had special need in this competitive world—competitive in industrial ideas and techniques as well as in products.

'This electronics and plastics industry, working as it is in a relatively new sphere, is doing a great deal to help us to improve our standard of living and to increase our technical ability and expertise in competition with foreign industries. It is certainly helping to improve our transport services in the air, at sea and on the railways.'

Analysing Rubber Vulcanizates

QUANTITATIVE ESTIMATION OF NR CONTENT

THE US National Bureau of Standards has recently developed a convenient method for determining natural rubber in vulcanizates of SBR and natural rubber. Based on studies by M. Tryon, E. Horowitz and J. Mandel of the Bureau's staff, the procedure involves thermal decomposition of the vulcanizates and infra-red spectroscopic analysis of the resulting products. This method will make it possible to perform quantitative analyses of polymeric materials that have defined analysis because of their insoluble nature or the presence of interfering fillers.

Time Consuming

Other methods for quantitative estimation of natural rubber in vulcanized samples have been described as difficult and time consuming. The direct analytical method involves successive steps where the sample is extracted, dried, and digested by chromic acid. A distillate of acetic acid, formed during oxidation of the sample is titrated and calculation of rubber hydrocarbon content is based on the yield of acetic acid. The direct method, besides being involved, often gives erroneous results for mixtures of natural and synthetic rubber. The indirect method is even less satisfactory. Here, all the non-rubber hydrocarbon constituents are determined, and the rubber content calculated by difference. The limitations of this method, especially in determining the non-rubber constituents, make the results subject to large cumulative errors; and no differentiation between natural and synthetic rubber is possible.

In the NBS method, the sample is milled and extracted with acetone, and the solvent removed by vacuum drying. A 0.5g. specimen is pyrolysed in a modified combustion furnace at 550°C. One or two drops of the liquid distillate are placed between two sodium chloride windows having a lead spacer 0.025mm. thick. Each liquid distillate obtained upon pyrolysis is analysed with a recording spectrophotometer using sodium chloride optics. The concentration of natural rubber is determined by comparing the relative intensity of absorption bands at wavelengths characteristic of natural rubber and SBR. These bands are 11.25 microns for natural rubber and 11.02 microns for SBR. The pyrolysis of the sample and its infra-red analysis require about 15 minutes, compared with four hours or more for analysis by the usual direct or indirect methods.

In the course of his analysis, the operator uses a calibration curve relating to the ratio of transmittances of SBR and natural rubber to the concentration of natural rubber. The work has established that the log of this ratio is nearly a linear function with respect to the concentration of natural rubber, based on the total polymer weight.

This method should also be of value in more fundamental studies of polymer degradation and de-polymerization. Here it could be used to obtain additional data on pyrolysis products unsuited to mass spectrometry.

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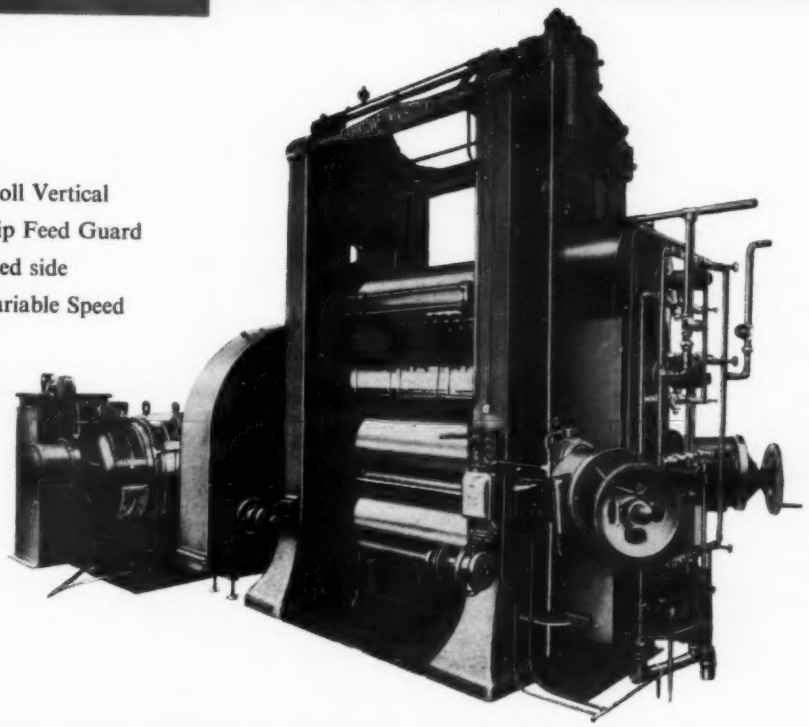

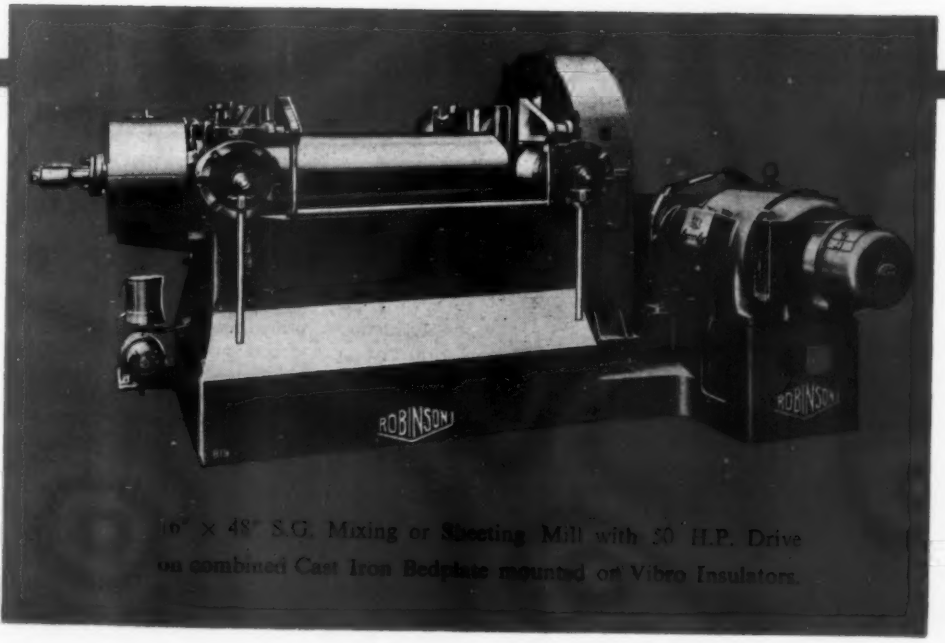

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VIEWS and REVIEWS

Swelling of NR Latex

PUBLICATION No. 296* of the British Rubber Producers' Research Association is a paper by P. W. Allen (BRPRA) entitled 'The Swelling Behaviour of Natural Rubber Latex' (*Journal of Colloid Science*, 13, 483-487 (1958)).

In his introductory statement the author points out that the distribution of a swelling agent among the particles of NR latex is of interest in connexion with several problems. Thus, in a study by Morton, Kaizerman and Altier it was indicated that the equilibrium uptake of swelling agents by latex particles should increase with particle size and experiments with polystyrene latex quantitatively confirmed their equation. From these previous experiments it appeared likely that in a latex such as that of natural rubber, the distribution of a swelling agent would be non-uniform, and favourable to the larger particles.

In the present paper this hypothesis has been tested, the swelling agent being a vinyl monomer, namely methyl methacrylate. It was found that the distribution was indeed non-uniform and that the large particles do absorb more swelling agent than the small particles.

As a matter of interest it may be mentioned that the latex used was a 60% commercial concentrate, suitably diluted with 1.5% ammonia solution.

Rupture of Rubber

Part 5 in the series Rupture of Rubber which constitutes pubiication No. 297 of The British Rubber Producers' Research Association deals with 'Cut Growth in Natural Rubber Vulcanizates,' the author being A. G. Thomas (BRPRA) (originally appearing in *Journal of Polymer Science*, 1958, vol. 1, 467-480).

Synopsis

In the present paper cut growth in natural rubber gum vulcanizates has been studied using both steady and repeated loading. The results have been expressed in terms of the concept of the energy for tearing that has been put forward previously. With cut growth under repeated loading the tip, initially smooth, becomes rough and the rate of growth simultaneously decreases markedly to a final steady value. The author discusses some consequences of this roughening. Thus, one point is that the roughness developed at the tip of the cut is independent of the overall shape of the test piece. With regard to measurements of cut growth under repeated loading, using two different types of test piece, it is mentioned that a rupture criterion, previously proposed, and which predicts a definite relationship between the behaviour of the two test pieces, has been confirmed experimentally in the paper.

Polythene Wins in 1958

'Polyethylene is now the champ!' are the opening words in a section on 'Markets for Materials—1958' in the January 1959 issue of *Modern Plastics*. The figures quoted in the following relate to the United States, and are based on the US Tariff Commission as the source for the first eight months, and the last four months are estimated.

It appears that whilst most other materials declined, or only rose slightly in 1958, polythene increased by about 160 million lb., or 25% over the previous year. Moreover, this increase is regarded as largely responsible for the fact that plastic and synthetic resins consumption was larger in 1958 than in 1957.

A few figures relating to the chief groups as given in *Modern Plastics* should be of interest.

Materials	*Consumption in lb.*
Polyethylene	820,000,000
Vinyl resins (all types including chloride, saran, butyral, polyvinyl acetate) ..	790,000,000
Styrene-type resins	670,000,000
Phenolic and other tar-acid resins	468,500,000

A point of interest is that polyesters showed a considerable increase, rising from 85 to 100 million lb. Increases in boats and glazing were partly responsible for this growth.

Many other details are given in the *Modern Plastics* article, but it may be mentioned that the grand total for consumption of all synthetic resins and cellulosics, including surface coatings, in 1958, is given as 4,157,200 million lb.

Methane Gas

With regard to the recent importation of a cargo of some 2,000 tons of liquefied methane in the *Methane Pioneer*, *Chemistry and Industry* of February 21 1959 has published a most interesting leader. Incidentally, it is mentioned that the cargo 'at −160°C. must be one of the coldest to have ever crossed the Atlantic.'

Crude oil, as it comes from the ground, contains dissolved gaseous hydrocarbons under pressure, the gases varying between 5-15 cu. ft. per gallon of oil. This is mostly methane, but may contain up to 20% of propane and butane, and a few per cent of nitrogen and carbon dioxide.

Whilst the 'gas' obtained from the oilfields in USA is usually sold for various purposes, is seems that in the oilfields in other parts of the world, enormous quantities of gas are perforce wasted. A figure mentioned by *Chemistry & Industry* relates to an estimate that in the Persian Gulf area some 300,000 million cu. ft. are annually wasted, this being rather more than the total gas consumption of Great Britain, 'which costs the Gas Council about £200,000,000.' I think it will be agreed that apart from any politico/economic considerations this is 'a staggering waste of energy at the expense of penurious mankind.'

With regard to the present first large scale importation, the article quoted says that, unlike some previous proposals, a 'system is being pioneered by the Gas Council and the North Thames Gas Board which seems likely to

*Reprinted from *Journal of Colloid Science*, Volume 13, No. 5, October 1958. Printed in USA

COMMENT ON SCIENTIFIC AND INDUSTRIAL MATTERS

by **DR SCHIDROWITZ**

prove quite practicable.' For further interesting details I must refer readers to the *C and I* leader, in which, *inter alia*, the engineering aspects of a project such as that to which this note refers, are stressed.

Elastomer Properties at High Temperature

Attention is drawn to a paper entitled 'Properties of Elastomers up to 550°F — 1.' by F. M. Smith (Firestone Akron) in the January 1959 issue of *Rubber World*. This is Part I of an elaborate, and highly important, contribution, covering much detail on a subject which is of increasing importance. This paper was given before the Division of Rubber Chemistry at the Cincinnati meeting in May 1958.*

Method

It is quite impracticable, having regard to the elaborate nature of this paper, to give any comprehensive general information as regards method or results, but it may be mentioned that the extent to which an elastomer compound retains its original stress strain properties after exposure to high temperature for eight hours in circulating air, was used as one measure of its heat resistance.

Foam Catalyst

In the 'New Materials' section of a recent issue of *Rubber World* (1959, *vol. 139*, 586) there is an interesting item headed 'Dabco-Foam Catalyst,' in which it is stated that 'Dabco' relates to a 'new one-shot polyether catalyst used for producing odourless urethane foam.' The material named has been developed by the Houdry Process Corpn. (Philadelphia). 'Dabco,' it is added, is in chemical parlance triethylenediamine, and not only foams one-shot polyether systems, but can also be used to produce foam from 'polyether prepolymers, dimer ester acid ester, adipic acid esters, and copolymers of dimers and polyethers.' It is also expected to have application in urethane coatings.

Utility

As regards applications and utility it is expected that the catalyst named will supplant 'the costly, tedious, prepolymer techniques now being used in most urethane foam manufacturing,' and that the manufacturer reports that it can be used to foam any or all commercial polyethers 'to produce flexible, rigid, or semi-rigid foams with a wide range of controlled properties.'

On the commercial side it is expected that the catalyst discussed will improve the economics of urethane foam production, while simplifying manufacturing procedures and 'eliminating problems of reproducibility, storage and shelf life.'

Foam Properties

It is stated in the *RW* report that flexible foams produced with 'Dabco' are said to have low compression set, good elongation, tensile, and tear and shear strength properties, and that they exhibit 'excellent load-bearing characteristics.'

RT Curing Silastic

Another amongst the interesting 'New Materials' in the *Rubber World* section quoted above is a 'New Silastic RTV 502' which is a 'new room-temperature vulcanizing silicone rubber,' and, according to Dow Corning Corpn. (Midland, Mich.), is an easy-to-apply liquid which cures to a rubber in 'only 30 minutes, or about 20 times faster than conventional RTV silicone rubbers.' Special features of the material described include:

'It remains rubbery from −70 to 500°F.; it has excellent insulating properties; resists weathering and moisture; withstands ozone; has good corona resistance; and absorbs mechanical shock and vibration.' Silastic RTV 502 is stated to be suitable for patching, sealing, calking, potting and making parts for models and prototypes. 'Its quickness feature may be especially useful in making impressions of objects; the impression can then be used as a mould to duplicate the original object.'

Notes

In *News Bulletin No. 58* Columbian International (Great Britain Ltd.) announce *Genthane-S* a polyurethane elastomer developed by the General Tire & Rubber Co., distributed by Columbian. This is stated to have outstanding abrasion resistance, and excellent resistance to ozone and oxygen. Good performance at low temperature, and 'remarkable stability at temperatures up to 300°F.' are also claimed. *News Bulletin No. 60* of Columbian International Ltd. relates to 'Butyl Insulation using Whitetex 2 Clay.' This relates to cablework. There is, *inter alia*, a reference to Company Research Depot No. 14 of Naugatuck Div. (US Rubber) 'which . . . will be most useful to those working on butyl rubber.' According to a letter of January 30 from Columbian the sale here of *Mapico Oxides* is now again possible, and attention is drawn to the properties of these materials which are 'famous for their stability.' Their properties are set out in the said letter.

PHILIP SCHIDROWITZ

*It is stated that a major part of the work reported in this paper was conducted under US Air Force Contract, Nos. . . ., which was administered under the direction of the Materials Laboratory, Wright Air Development Center, Dayton, O.

Adhesives in Mexico

FOURTEEN FACTORIES

THE National Chemical Chamber has announced that Mexico now has 14 factories turning out adhesives and glues of all types, including resin-based glues and others from bases of phenolformaldehyde, ureaformaldehyde, casein, vinyl acetate and other vinyl derivatives, rubber, dextrine, feculas, etc. Only urea, casein and catalysing agents are imported, all the other materials being available locally.

Questions Corner—64

(Second Series)

275. Water dispersions of polysulphide polymers have been produced. What are they?

276. Phenol - formaldehyde resins are not soluble in drying oils. What modifications can be made to phenolic resins to make them suitable for use with varnishes for surface coatings?

277. What are the essentials to be considered in the formulation of pigment pastes for emulsion paints?

278. What is the nature of the elastomer process for the production of open-cell PVC?

(Answers next week)

Answers to Questions Corner—63

271. Pigments used in PVC pastes are added primarily to improve the decorative effects, but they may also act as stabilizers, or destabilizers. Certain pigments have a chemical reaction with the PVC and should not be used *e.g.* iron and zinc pigments. There are, of course, a number of well-tried colouring materials, both organic and inorganic, which are quite suitable, but the manufacturers of such materials should be consulted before they are used. Heat stability is reduced in the presence of pigments containing, zinc, cobalt, copper, iron, free sulphur, manganese, etc. On the other hand, pigments containing cadmium, tin, calcium and lead tend to improve the heat stability.

Lead stabilizers are best avoided when pigments have been shown to have poor light stability, and inorganic stabilizers are preferred, particularly where there is a tendency for migration of the plasticizer and/or colouring materials to occur. Colouring materials can act as light stabilizers as many of them possess actinic screening properties which lessen the breakdown of the polymer by ultra-violet light.

It must be noted that colour stability also depends on the quantity and type of plasticizer, the stabilizer and even the type of polymer may have some effect. Most pigments have an adverse effect on the volume resistivity of PVC compounds and when paste formulations are devised requiring some electrical properties this should be borne in mind. This effect is very slight when carbon black is used but is quite marked with some other colours.

272. A polyvinyl chloride paste making polymer is one which has a high molecular weight and which will form, at room temperatures, a viscous liquid on mixing with normal amounts of plasticizer. It is necessary that the polymer must be capable of forming a paste by the simple addition of just sufficient plasticizer to give a non-tacky film after fusion by heat. It is possible to make a paste from almost any type of emulsion-polymerized material but a better polymer is obtained for this purpose if specially manufactured to give a small particle size between 1 and 2 microns.

Paste making characteristics are determined by three factors: 1. The particle size and distribution which can be controlled during the manufacture of the polymer, but it can be further influenced by subsequent grinding, although this is not usually required. 2. The reaction of the plasticizer on the surface of the particles. 3. The chemical nature of the particle affecting the swelling by the plasticizer and/or the solution properties.

Paste making PVC polymers can be utilized in two ways: a. Plastisols. These are pastes which are formulated with 100% solid mixtures of polymer, plasticizers and compounding ingredients. b. Organosols. These are low viscosity mixtures of polymer and compounding ingredients dispersed in a mixture of plasticizer and organic diluent. The solids vary between 60-80%. Proper balancing and the diluent is essential.

273. In the formulation of an emulsion paint there are several considerations that need to be borne in mind in respect of the processing and of its ultimate use. First of all there is the question of adhesion which depends on several factors, including the preparation of the base to which it is going to be applied *e.g.* if the surface is very porous it will absorb the aqueous phase at a rapid rate and coagulate the system to a loose gel-like mass which will be useless. To overcome this difficulty the porous surface should be treated with an unfilled resin emulsion, or a dilute lightly filled paint. Plasticized polystyrene emulsions have been found suitable.

In the case on non-porous surfaces, the use of a primer is indicated and one based on a polystyrene emulsion is also to be recommended. Good brushability is essential and as the viscosity of emulsion paints deviates from the Newtonian behaviour some ingenuity is required to overcome the physical effects of yield value, shear and thixotropy. Incorrect compounding ingredients, too high a solid content, and small amounts of sequestering agents may cause trouble. The addition of a pigment or extender with a high water absorption, used in moderation, may overcome some of the trouble *e.g.* anatase titanium dioxide, china clay, bentonite etc.

274. There are three methods for the identification of nylon yarn:

1. *Flame test.* Apply a flame to the sample:

A. The fibre does not support combustion after removal from the flame: a. Fibre fuses to a hard, round bead, giving off an amide odour—Nylon. b. Fibre shrinks and forms a bead with no definite shape. Odour of burned paraffin wax—Vinyon.

B. Fibre continues to burn after removal of flame: a. Fibre fuses on ends, acetic odour—Acetate. b. Fibre does not fuse—1. Odour of burned hair or feathers when flame is extinguished—Silk. 2. Odour of burned paper when flame extinguished—Viscose.

2. *Solubility test.*

A. Fibre insoluble in acetone: a. Readily soluble in 88-90% phenol—Nylon. b. Insoluble in 88-90% phenol—1. Swells and dyes pink with Millons Reagent—Silk. 2. Fibre does not swell nor dye pink in Millons Reagent—Viscose.

B. Fibre readily soluble in acetone: a. Readily soluble in tetrachloroethane — Vinyon. b. Not readily soluble in tetrachloroethane—Acetate.

3. *Heat test.* Heat sample at edge of flame below ignition point:

A. Fibre fuses. a. Fuses to a hard, rounded bead, giving off a white vapour and amide odour. Bead cannot be crushed with the fingers—Nylon. b. Fuses, no amide odour—Acetate.

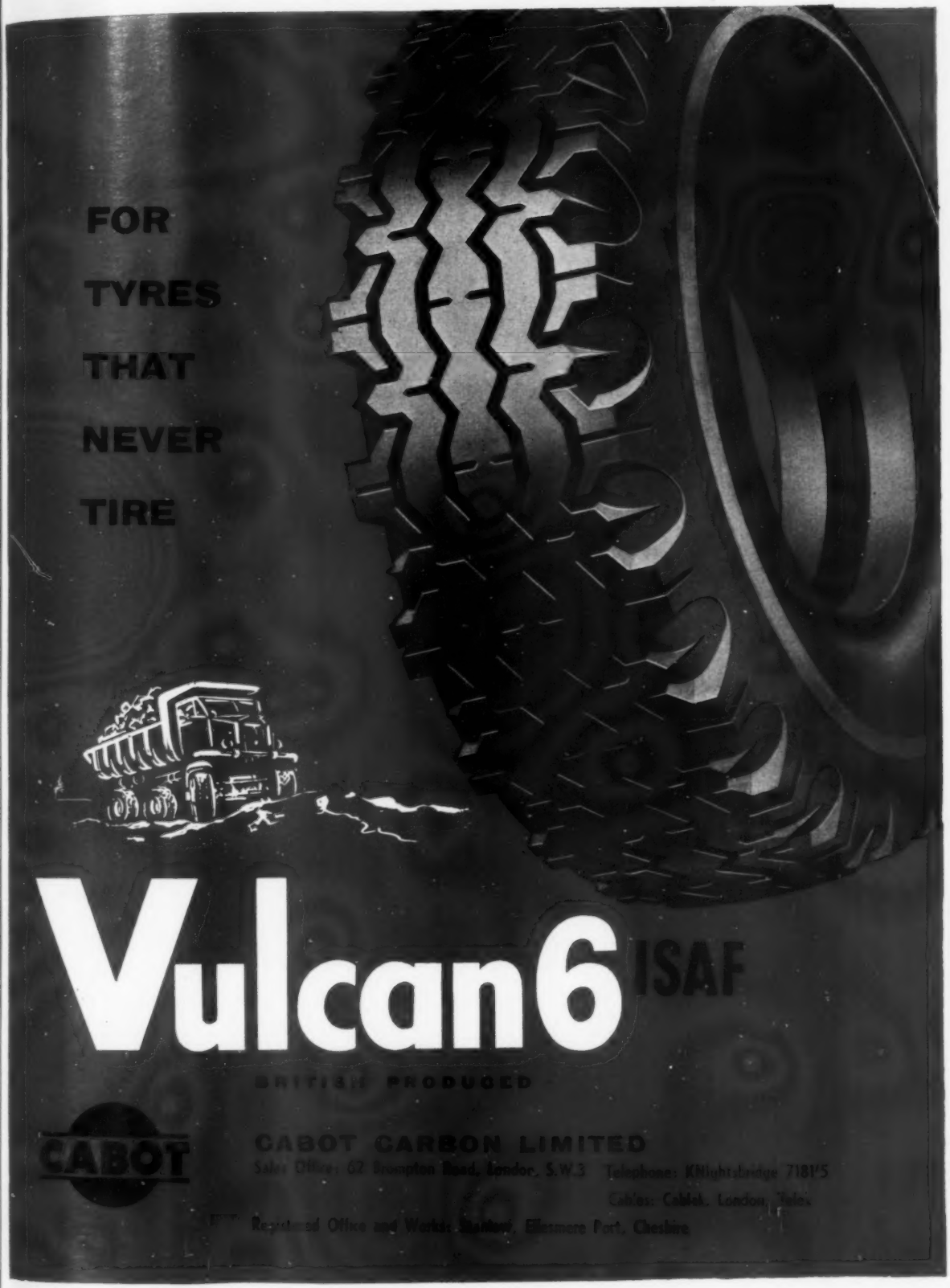
B. Fibre shrinks from flame—Vinyon.

C. Fibre neither shrinks from flame nor fuses—Viscose or silk.

(More questions next week)

Polly Ester Says . . .

'Heat sealing—torrid osculation'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MEN and MATTERS

A Review of People and Events

by George A. Greenwood

AFTER spending several weeks in Malaya, Sir John Hay, chairman and managing director of Guthrie and Co. Ltd., and chairman or director or both of several of its associated companies, has just returned to London, and has been giving his impressions to some of us about conditions as he found them there. Sir John, as his friends know, is an inveterate business traveller, and he was in South East Asia something a little more than a year ago, along with Mr Harold F. Copeman and Mr A. P. Hamilton, when it may be recalled I wrote about their tour under the title 'Three Men in a Boat.'

Apparently, Sir John who, as we all know, has big interests in Malaya, is impressed by the excellent way in which the country has settled down to its independence.

'It is like an oasis of peace, surrounded by trouble spots,' he added. 'Last time I was there I had to go about protected by armed men. There was nothing of that this time.'

It is interesting to note that Sir John, now 71, first visited Malaya in 1925—practically 34 years ago.

Distillers' Appointments

A number of changes in the Distillers Plastics Group were announced at the end of last week.

With effect from April 1, S. R. Badley is appointed Market Development Manager, Distillers Plastics Group. Mr Badley was formerly sales manager in charge of Binder Resins for British Resin Products Ltd. and this appointment will now be taken over by C. D. Harvey-Piper. L. R. Anthony has been appointed information officer and A. E. Oates, publicity officer, for the Distillers Plastics Group.

British Geon Ltd. announce that R. J. Facer has been appointed General Sales Manager. J. E. Richardson takes over as Export Manager from S. A. Williams who becomes Administration Manager (Sales). G. Y. Blomley has been appointed Northern Manager.

At British Resin Products, J. D. Winston has been appointed General Sales Manager, and is now responsible for the sales of all the plastics materials produced or marketed by BRP. G. E. H. Smock, who was previously assistant sales manager in charge of Rigidex Polyethylene, has been made sales manager for this material.

P. Brown takes over from Mr Harvey-Piper as sales manager for Cellomold, Rockite and Styron materials. R. Hayes has been appointed as technical service manager for Rigidex Polyethylene, taking over from Mr Brown, while J. D. Davies takes over as technical service manager for Cellomold, Rockite and Styron with effect from April 1.

The judges of the Ekco 1958 'Picture Baby' Competition had a difficult task in selecting the winners from many hundreds of entries. They are seen here during the judging (*left to right*): **Mr David Pradford, director and general manager of Ekco Plastics Ltd., Miss J. B. Scully, executive editor of 'Wife and Home,' and Mrs E. Joel, picture editor of 'The Baby Book.' Prizes in the competition, open to all purchasers of Ekco 'Gold Seal' nursery ware, were £100, £50 and £25, with additional prizes to retailers**

Dunlop Director

Another interesting rubber appointment is that of Mr D. W. Hawkins,

D. W. HAWKINS

a former director and general manager of Dunlop Plantations Ltd., who has been appointed to the main board of the Dunlop Rubber Company, Joining the organization in 1927, Mr Hawkins, who is 54, became controller of the company's material supply division last year.

Percy Coombes

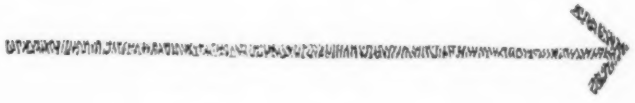
Not so very long ago, we were referring, briefly, to the retirement from the Cape Asbestos Co. Ltd. of Mr Percy Edward Coombes, after 40 years of distinguished service. There are some extremely interesting references to his career in the current issue of the *CAC Magazine*, a copy of which has just reached me.

Mr Coombes, it is recorded, joined the company on April 1 1916 upon his discharge from The Hertfordshire Yeomanry, and was first a stock ledger clerk at the Barking factory, a modest affair in those days. In 1917 he was transferred to the London office, becoming cashier, and later, when the headquarters were moved from the City to Morley House, Holborn Viaduct, he took charge of the accounts department. And so his progress continued—to chief accountant, and secretary of the company—and he was adviser to the managing director on both financial and administrative affairs. In 1946, when the Cape Company acquired the Uxbridge Flint Brick Co., he became manager of the Uxbridge factory, and

A Question For Every Rubber Compounder . . .

What is 'FORTAFIL' ?

The answer is on page 441



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a year later he was appointed a director of this company. In 1948 the Harefield Lime Co. was formed and of that he was made managing director, and, as the tribute says, it is with the production and development of Asbestolux board that Percy Coombes' management at Uxbridge will always be especially associated. The whole of the Uxbridge manufacturing activities were combined on the formation of Cape Building Products Ltd., with Mr Coombes as managing director, 'a lion for work, a tiger for thoroughness and efficiency.'

Turner and Newall's New Head

It was announced at the weekend that Mr R. G. Soothill, of Lowerfold, Rochdale, deputy chairman of Turner and Newall, and for several years joint managing director, has been appointed chairman of the company in succession to the late Sir Walker Shepherd. Mr Soothill, a man of impressive but kindly appearance, who is in the middle years, has had the better part of a lifetime of experience in this particular branch of industry. He is ex-chairman of Turner Bros. Asbestos Co. Ltd., and chairman of Ferodo Ltd., and J. W. Roberts Ltd., and is particularly well known in the Midlands and the North. He comes of a leading Methodist family which has long been connected with Ashville College, Harrogate, where he himself was educated, and where the former headmaster was his father. He is now chairman of the governors.

The new deputy chairman of the company is Mr R. M. Bateman, who has had more than 25 years' service with it, and who succeeded Mr Soothill not very long ago as chairman of Turner's Asbestos Cement Company.

Retirement Presentation

As a follow-up to the news I gave a little while ago, about the retirement of Mr A. E. Hughes as general overseas manager of the BTR Group, it is pleasant to hear that at an informal ceremony which took place recently, Mr P. W. Howard, deputy chairman and managing director of BTR Industries Ltd., presented gifts to him from former colleagues, and conveyed their good wishes for his future.

Mr Hughes has had approaching 40 years' association with the rubber industry which he entered after the first World War, in which he served with distinction, and was awarded the Military Cross. He joined the Silvertown Rubber Co. Ltd. in 1931. He became responsible for Silvertown sales, and later for all export activities of the BTR Group. He was appointed a director of the Silvertown Company in 1952.

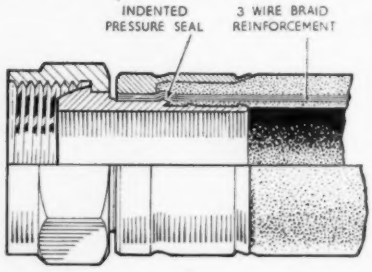
Some More Appointments

One of the directors of Perrite Ltd., the rubber manufacturers of the Weld Bank Mills, Chorley, Lancs., Mr Alastair Fordyce, M.B.E., has been appointed Commanding Officer of the 42nd (Lancs.) Infantry Divisional Column R.A.S.C. (T.A.) and promoted to the rank of Lieutenant-Colonel in the Territorial Army. The Column has three Companies in Manchester and one in Rochdale.

Mr P. W. Howard presenting gifts from former colleagues to Mr A. E. Hughes at a recent ceremony to mark the latter's retirement as General Overseas Manager of the BTR Group

Dunlop High Pressure Hose

A HIGH pressure flexible hose for the conveyance of gases and fluids has been developed by Dunlop at its Coventry factory. It is expected to be of particular value in mining, rock drilling and other conditions where



flexibility, resistance to vibration and high working pressures are required.

The new pipe, which is reinforced by three high tensile steel braids, has 1¼in. diameter bore and a working pressure of 4,000 psi. The use of nitrile rubber for the seamless inner lining enables it to carry nitrogen, mineral and vegetable oils, petrol, kerosene and coolants. There is an abrasion-resistant neoprene outer cover, which is spark-proof and highly resistant to oil, steam and exposure to sunlight. Operating temperatures for fluids or gases are up to 130°C. and ambient temperatures are from minus 30°C. to plus 100°C.

The metal end fittings are 'swaged' on to the rubber hose, forming an indented pressure seal. The steel insert has an integral annular ring with a wedge-shaped seating formed on the underside, which makes contact with the face of the inner lining tube. The design of the ferrule or sleeve ensures that during 'swaging' the seating will indent the face of the rubber to form a leak-proof seal.

Hall and Hall

It is announced by Hall and Hall Ltd. that they are undertaking a large re-equipment and modernization scheme at their Oldfield Works, Hampton, Middlesex, to satisfy the increasing demand for their rubber and synthetic rubber sealing products. To facilitate this project, the automobile gasket division has been sold to the Engineering Components group of companies. Industrial gasket production will be continued and developed, and the trade mark 'Hallite' remains the exclusive property of Hall and Hall Ltd.

Pataling Rubber Estates Ltd. announces that its offer to purchase the whole of the stock of Strathisla (Perak) Rubber Estates Ltd. not already held by it has now been accepted by the holders of approximately 97.7% of that stock.

'Fortafil' *A 70 is I.C.I's trade name for its NEW reinforcing filler, now available to the rubber industry.*

But what's different about 'FORTAFIL'?

See page 443

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Companies in the News

Anchor Chemical Company

In his annual report, the chairman of the Anchor Chemical Co. Ltd., Mr Thomas Martin, states: The group trading profit before taxation is £140,413 (which includes an exceptional non-recurring dividend of £7,350 received from an associated company), an increase of £17,961 over the previous year. The group trading profit after taxation is £72,348 (£55,545) and of that sum £69,621 (£52,984) is attributable to our company. The directors propose that £25,000 should be allocated to general reserve (making total £100,000), and that the final ordinary dividend be maintained at 12½% (less income tax) making a total of 17½% for the year. The total of issued share capital plus reserves has increased by £42,844 to £613,522 which represents the shareholders' real capital employed in the business. Our sales continued steadily throughout the year and finally finished approximately as last year, just over 5¼ million sterling.

As manufacturers and distributors of chemicals used primarily in the processing and fabrication of natural and synthetic rubbers and other elastomeric polymers we are confronted with an increasing number of commercially available elastomers. The compounding of these, in many cases, becomes a matter of complete revision rather than of simple substitution and accordingly our various laboratories (chemical and physical testing, service and research) are being pushed to the utmost.

Bakelite Ltd.

Group profits of Batelite Ltd. in 1958 increased by nearly £108,000 to £538,458 but the total ordinary dividend is being held at 15% with a final payment of 10%. Of the profit debenture interest takes £48,519 (against £49,350) and tax £250,609 (£156,200, which was reduced by benefits from provisions set up in previous years), leaving a net profit after all charges of £239,330 (£225,472). The preference and ordinary dividends together take £163,875 (same).

Kuala Lumpur Rubber

In the course of his circulated statement for the year ended June 20, Mr H. F. Copeman, chairman of the Kuala Lumpur Rubber Co. Ltd., said that the directors had good reason to be satisfied with the progress that was being made on all estates. After full consideration they had decided that it would be to the advantage of the company to liquidate the recently acquired Sungei Chermang company and to transfer estates and other assets to the parent company. Last year's crop for the Kuala Lumpur estate was 4,127,242lb., which was an increase of 525,383lb. over the previous years' crop. The Sungei Chermang crop over the same period amounted to 2,392,000lb. an increase of 327,000lb. Due to the acquisition of Sungei Chermang, the issued capital of the parent company had been increased from £491,250 to £685,665. Profit after tax was £55,262 and the dividend is maintained at 10% tax free.

BTR Industries

A reduction of some 30% in the trading profit of BTR Industries Ltd. (£1,003,052, compared with £1,441,135) is announced by the chairman of the company, Sir Graham Hayman, in his annual report. The balance available for appropriation by the parent company is £308,491, against £529,264. Adding the balance carried forward last year, the available balance is £646,190. In the course of his statement, the chairman said that the most significant factor which accounted for reduced profit was the contraction of demand for conveyor belting. He went on:

'Our Linings and Coverings Division has been strengthened by the recent acquisition of the European rights of the Synco process for the spraying of Neoprene for corrosion protection. In spite of the changing pattern of its requirements, we believe that the UK aircraft industry offers scope for increased sales of high-precision components by our Aero Products Division (Palmer Aero Products Ltd.). To cater for this business, we have extensively reorganized and re-equipped our production facilities, and have introduced new products which include flexible pipe assemblies incorporating PTFE which, under a licence agreement with the Resistoflex Corporation of America, we are making and marketing as Fluroflex. Under a manufacturing agreement with the Parmatic Engineering Company of Canada, we are now offering advanced designs of filtration devices. Under licence from the Garrett Corporation of the USA, Palmer will be supplying BOAC with inflatable escape slides.

'The present impasse in the European Free Trade Area negotiations is a matter of some concern, as Western Europe is an important market for us. The present discussions between British industry and our Scandinavian counterparts aimed at freer trade between the Outer Six countries should be pursued, provided a wider association, including the Common Market, remains the final objective, and it is hoped that, in the interests of European trade as a whole, such wider settlement will be achieved.'

British Industrial Plastics

The annual general meeting of British Industrial Plastics Ltd. was held in London on March 12. In the course of his statement, the chairman, Mr E. R. Crammond, said: The net profit of the group, before taxation, for the year to September 30 1958, was £698,614, compared with £667,440 in the previous year. This is now the record in the group's trading profits since its inception, and I feel sure you will consider this result very satisfactory. The final dividend is 12½%, less tax, making 20% for the year.

All the subsidiary companies, with the exception of B.I.P. Reinforced Products Ltd., showed a profit, but the latter company only commenced full-scale operations during the period under review. During the year the total capital expenditure of the group amounted to over £490,000. There is in course of erection at Oldbury a new plant for the manufacture of formaldehyde.

Since the end of the company's financial year a site has been purchased near Durban, South Africa, and a factory will shortly be erected there for British Industrial Plastics S.A. (Pty.) Ltd., a wholly-owned subsidiary. We have given careful thought to the probable effect on our sales to our European customers consequent upon the formation of the European Economic Community of six countries, and we now have under active consideration the formation of a new company jointly with a prominent Dutch concern, Algemene Kunstzijde Unie N.V. Negotiations for such a project are in an advanced stage, and it is proposed that we should have a substantial holding, but not a controlling one, in the new Dutch company which it is intended should erect a factory in Holland for the manufacture of urea formaldehyde and melamine formaldehyde moulding powders and resins.

Turning to the engineering side of the group's activities, it has been decided to establish a small wholly-owned subsidiary company in Western Germany for the assembly, sale and servicing of the products manufactured by BIP Engineering Ltd. and BIP Tools Ltd.

As you will see from the foregoing, our business continues to expand. We are, as you know, engaged in the thermosetting side of the industry, but in due course we propose to extend our activities into other fields within the industry. As to the immediate future sales for the period since the beginning of the new financial year to date have held up satisfactorily. We may have to expect smaller margins of profits as times goes on and competition increases, but we hope to combat this situation by increased sales.

Hubron Appointment

Mr J. H. Brown, M.A. (Oxon.), has been appointed a director of Hubron Rubber Chemicals Ltd.

Mr Brown is the son of the late Mr John Brown, and grandson of the late Mr Hugh Brown, who were founder-directors of the company.

'FORTAFIL'

Rubber Reinforcing Filler

is granular in form

Because of this,
'Fortafil' *effectively reduces the dust nuisance.*
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And in addition, 'Fortafil' *is easily dispersed during compounding, and has superior reinforcing properties.*

These are the salient facts about 'Fortafil' A70 (aluminium silicate). If you would like full technical details, please fill in the coupon and post it to :

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Rubber Statistics

MALAYA — VIETNAM — THAILAND — SOLE CREPE

THE January totals for imports and ocean shipments of rubber have now been received from Malaya House. The following tables, which are expressed in long tons, summarize the information issued:

	Sheet and Crepe	Latex
Ocean shipments to:		
UK	13,369	3,339
USA	15,006	2,584
South Africa	1,766	97
Canada	2,628	63
India	1,376	—
Australia	1,808	126
Czechoslovakia	1,960	78
France	4,677	528
Western Germany	5,319	1,022
Italy	3,834	1,061
Netherlands	1,327	268
Poland	3,110	—
Spain	1,806	200
Sweden	1,613	48
USSR	4,265	—
Yugoslavia	1,244	—
Argentina	2,054	99
Japan	10,334	1,199
Turkey	1,166	49
Others	8,211	481
	86,873	11,242

Imports from:	Total
Indonesia:	
Sumatra	16,880
Borneo	6,219
Remainder	2,580
British Borneo	3,590
Thailand	1,636
Others	627
	31,532

Compared with December, the ocean shipment total for January was at a still higher level, with 98,115 tons as against 95,472 tons, despite the fact that there were no shipments to China, and only 4,265 tons were taken by Russia, compared with 12,130 tons in December. Shipments to the United Kingdom were some 3,000 tons up on the previous month, but those to the US were some 5,000 tons lower. Shipments to Japan, totalling 11,533 tons, were particularly large, and some 3,000 tons higher than in December. January shipments in 1958 amounted to 91,276 tons and in previous years had usually been 10/20,000 tons lower than the January total for this year.

Imports into Malaya, at 31,532 tons, were some 2,000 tons lower than the December total and compared with 31,881 tons imported during January of last year.

Vietnam

The Study Group has now issued details of Vietnam's exports during 1958. These totalled 67,651 tons, a drop of 5,000 odd tons compared with the 1957 figure of 72,538 tons.

France took the bulk of these exports, with 54,797 tons, while the USA took 7,260 tons. The United Kingdom received 2,225 tons and Western Germany 1,791 tons. Other countries taking smaller quantities of this rubber included the Netherlands, Japan, Mexico and Singapore.

Thailand

The Study Group states that sole details of Thailand's 1958 rubber exports. These totalled 137,415 tons, compared with the 1957 total of 132,964 tons, and of this total 95,507 tons went to the USA and 10,013 tons to the United Kingdom. Malaya took 21,633 tons of this rubber and Western Germany 7,375 tons. Other countries taking smaller quantities of Thailand's exports included Belgium, France, Italy, the Netherlands, Norway, Australia, Canada, Hongkong and Japan.

Sole Crepe Exports

The Study Group states that sole crepe exports from Malaya during December totalled 568 tons, compared with the November total of 761 tons, and brought exports for the year to 9,925 tons, compared with the 1957 total of 17,389 tons. The United Kingdom took 4,625 tons of the year's exports and the USA a mere 190 tons. Poland and Spain were the second and third best customers for this rubber after the United Kingdom, taking respectively 969 tons and 822 tons. Hongkong took 568 tons, Japan 458 tons and France 467 tons. Appreciable quantities also went to Western Germany, Itaiy, and the Netherlands, while Russia took 220 tons.

Ceylon's crepe sole exports during December amounted to 51 tons, bringing the total for the year to 947 tons compared with the previous year's figure of 2,476 tons. Of this total the United Kingdom took 301 tons and the USA 121 tons.

Vietnam's exports totalled 1,111 tons during 1958, of which all but 13 tons were taken by France. The 1957 total for Vietnam's exports of sole crepe were 5,294 tons.

Asbestos Output

Shipments of asbestos from Canadian mines dropped 12% in 1958 to 925,670 tons from the preceding year's 1,048,084 tons. Year's exports fell 16% to 866,630 tons from the preceding year's of 1957 1,030,560.

December's shipments were larger than in 1957 at 63,120 tons (52,187), but exports were smaller at 81,386 tons (84,550).

With effect from March 23, the address of Kingsley and Keith Ltd., chemical merchants, will be Rex House, 38 King William Street, London, E.C.4. Telephone: MINcing Lane 1101-6.

MIDLAND SILICONES

Mr C. B. Evans has been appointed to the board of Midland Silicones Ltd. Mr C. B. Evans joined the company in 1955 as works manager of the Barry plant. He has spent all his working life in the chemical industry, having previously been production manager for Peter Spence and Sons Ltd.,

C. B. EVANS

Widnes, and having before then held various appointments during a period of 13 years with the General Chemical Division of Imperial Chemical Industries, both at Thornton and at Widnes. Mr Evans, who is married, with two children, is a native of Cardiff and was educated at Cardiff High School and at Cardiff University College, where he graduated in Chemistry and Metallurgy. In 1956, Mr Evans spent some time in the United States at the Midland (Michigan) headquarters of the Dow Corning Corporation, with whom, as with Albright and Wilson Ltd., Midland Silicones are associated.

Cassiar Asbestos

Early forecasts for 1959 of the Cassiar Asbestos Corporation indicate a small reduction in the sales volume, according to the president, Mr F. M. Connell, but with improving general business it is expected that the current year would compare favourably with last year. Development work on the lower adit at the mine had given Mr R. E. Facius, of Seaton Street, encouraging results and indicated a substantial increase in ore reserves. Capital expenditures on plant and equipment this year would total about $500,000 and another $750,000 would go towards mine development and outside exploration.

Mr Alan H. Marshall has been elected a director of the Bukit Rajah Rubber Co.

PATENT SPECIFICATIONS

The following information is prepared from published Patent Specifications. The full Specifications can be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 3s. 6d. per copy (including postage).

Solid Silicon Monoxide and its Use in Rubber

Nos. 804,991-4. The B. F. Goodrich Co. Application and Filed, May 5, 9, 16 and 19 1955, respectively. Application in USA, May 28 1954. Published, November 26 1958.

804,991.—Silicon monoxide gas is produced by heating sand and coke to a high temperature by means of an electric arc and the gas is then condensed under non-turbulent conditions in an inert gas, *e.g.* nitrogen, to form solid silicon monoxide. The product has a large surface area and contains a high proportion of fibre-shaped particles.

804,992.—Solid silicon monoxide is prepared by a process similar to that of Specification No. 804,991, except that the inert condensing gas contains 0.5 to 9.0% by volume of ammonia or an amine. The use of the product as a reinforcing agent for natural and synthetic rubbers is claimed and data are given for the tensile properties of a natural rubber vulcanizate containing 60 phr of solid silicon monoxide prepared according to the process of the invention.

804,993.—The use of silicon monoxide as a reinforcing agent for natural and synthetic rubbers is claimed. It can be used as a replacement for carbon black and data are given for the tensile properties of vulcanizates of natural rubber and of SBR containing silicon monoxide.

804,994.—Solid silicon monoxide prepared according to prior processes, as well as the processes of Specifications Nos. 804,991-2, is brown in colour. According to the present invention, solid silicon monoxide is converted into a white pigment by heating the brown material in an oxidizing atmosphere under specified conditions. Data are given for the tensile properties of vulcanizates of natural rubber and SBR containing 60 phr of white silicon monoxide prepared according to the process of the invention.

New Vinyl Monomer and Its Polymers

No. 807,016. American Cyanamid Co. Application and Filed, May 11 1955. Application in USA, May 18 1954. Published, January 7 1959.

A new vinyl monomer is claimed, namely N-vinyl-2-oxazolidone, as well as its homopolymers, copolymers and graft polymers. The monomer is produced from relatively cheap raw materials and lends itself readily to homopolymerization and copolymerization reactions under a wide variety of conditions. A long list is given of known monomers which can be copolymerized with the new monomer.

The polymers and copolymers of N-vinyl-2-oxazolidone may be used as moulding compositions with or without a filler or other additive. Compositions made by reacting the new monomer with unsaturated alkyd resins may be used for bonding together sheets of fibrous material to form laminated articles. Numerous examples are given covering the preparation of the new monomer and its polymers and copolymers.

Self-Sealing Articles

No. 807,018. The B. F. Goodrich Co. Application and Filed, October 4 1955. Application in USA, October 22 1954. Published, January 7 1959.

Certain polyacrylate compositions are claimed for self-sealing of tyres, tubes, fuel cells and other rubber articles subject to puncturing. To improve processing of the compositions on mill rolls, a proportion of natural rubber or a synthetic rubber may be blended with the polyacrylate, preferred blends containing at least 50% of the polyacrylate. Polybutylacrylate is used in all the examples, either alone or blended with butyl rubber, SBR or natural rubber. Several of the compositions given as examples were tested in tubeless tyres.

Ethylene Copolymers

No. 807,198. E. I. du Pont de Nemours and Co. Application and Filed, May 24 1956. Application in USA, May 27 1955. Published, January 7 1959.

Copolymers of ethylene with vinyl salicylate or allyl salicylate are claimed. The copolymers contain at least 50% of polymerized ethylene and 3 to 50% of polymerized salicylate, and they may be cross-linked by means of a chelating polyvalent metal, the method of chelation preferably being that described in Specification No. 791,325.

The copolymers may be formed into sheets, films, filaments, coatings and mouldings. Chelation of the polymers renders them resistant to heat and to solvents and enhances their strength. Uses for the unchelated copolymers are for wrapping material for food products, book covers, fabric coatings, electrical insulation and sponges. The chelated copolymers may be used for can lining, electrical insulation resistant to high temperatures, fabric coatings and protective coatings for wood, metals and other materials. Many examples are given of the preparation of the copolymers together with data for their zero strength temperatures and tensile properties.

Shorter Abstracts

Polyurethane Foam. 805,167. The B. F. Goodrich Co. Filed, September 20 1956.—The shock-absorbing characteristics of polyurethane foam are improved by incorporating finely divided PVC in the reaction mixture of polyester, polyisocyanate and water used to prepare the foam. The proportion of PVC is 10 to 60 parts per 100 parts of polyester.

Finishing Leather. 805,492. Imperial Chemical Industries Ltd. Filed, December 21 1955.—Leather is treated with a plasticized aqueous dispersion of vinyl chloride-vinyl acetate copolymer, the plasticizer being incorporated in the dispersion by the process of Specification No. 766,654. The finish is very resistant to dry and wet rubbing and has no tendency to stickiness.

Accelerators. 805,742. The Goodyear Tire and Rubber Co. Filed, May 4 1956. — Thiocarbamyl - amine-disulphides are claimed as vulcanization accelerators for natural and synthetic rubbers.

REVIEW

BRITISH PLASTICS YEAR BOOK 1959: A CLASSIFIED GUIDE TO THE PLASTICS INDUSTRY. 29th Edition. (Published on March 6 1959 by Iliffe and Sons Ltd. Price 42s. net. (postage 1s. 9d.). Size 9¼in. x 6¼in. 644 pages.)

This latest edition of *British Plastics Year Book* has been thoroughly revised and is even better than before. It has now been divided into nine sections devoted to classified lists of manufacturers and suppliers of materials; finished products and equipment; lists of trade and proprietary names connected with the industry, covering materials as well as finished goods and followed by a definition of the product and the manufacturer concerned.

The names and addresses section containing nearly 4,500 firms associated with plastics in the UK and overseas, while the 'Who's Who' section lists names and positions of prominent people in the industry in Great Britain.

A set of tables giving comparative properties of plastics materials was included for the first time in the previous edition. This useful feature has been revised and brought up-to-date, and in the same section is included a revised glossary of technical terms and specifications relating to plastics.

The up-to-date information which this excellent year book provides makes it invaluable to all connected with the plastics industry.—P.E.

∴ Copies may be ordered through the Books Department, RUBBER JOURNAL AND INTERNATIONAL PLASTICS, Maclaren House, 131 Great Suffolk Street, London, S.E.1.

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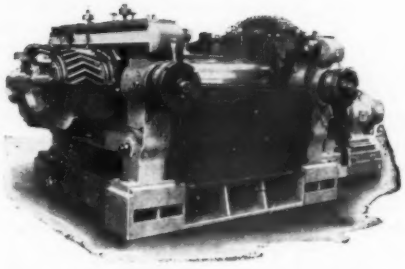
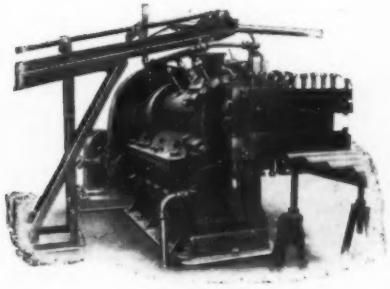


60" x 22" motor-driven single-geared mixing mill, back-shaft drive, with safety guard, electro-mechanical brake, hinged and swivel guide plates for easy cleaning

8" Forcing Machine fitted with "Camel-Back" Dies driven by variable speed A.C. Motor equipped with Feed and Output Conveyors



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Plantation Share Survey

THERE has been a decidedly more confident tone in the rubber plantation share section of the stock markets in the past few weeks. In fact one might go so far as to say that if a corresponding rise had taken place in industrial shares we would now be hearing talk of 'boom.'

The buying of rubber shares has been strong and furthermore it has had a long-term look about it. The volume of genuine investment in this part of markets has been on the increase, and by now it must far outweigh the speculative interest which has always been the dominating factor in the rubber section.

In the past few years, consequent upon the rise in output of synthetic, there has been a basic re-evaluation of the merits of rubber shares. The change has taken place very slowly and has taken a good deal of time to penetrate the inner sanctums of the City.

Broadly speaking the argument for buying rubber shares at the present time can be expressed as follows: Even three years ago the plantation industry was geared to produce on the basis of a price of around 30d. per lb. The more shrewd of the rubber company directors, and whatever the City has felt about rubber shares in the past, it is now forced to admit that there are many such men, anticipated a decline and planted vast quantities of new and higher yielding rubber. At the time these policies were the subject of some criticism, but now they are beginning to pay off. It is becoming increasingly apparent that the rubber planters as a whole would not feel comfortable with natural rubber much above its present level of 26d. lb. At this mark it is competitive with man-made rubber, but if the price of natural is rushed up, as it well could be with the present situation of low stocks and buoyant demand, then the degree of competitiveness will be correspondingly reduced and the longer term outlook for natural will be severely impaired.

The plantation directors feel that they can compete with man-made on the present basis and that the long-term demand for natural will remain fairly constant with the chance of a gradual increase, but if the price of natural rises much above the present level then it is feared that consumers will switch more and more to synthetic which is currently priced at around 21d. lb. to American users.

The following rises in leading rubber shares will illustrate the general pattern: UNITED SUA BETONG ordinary have more than established themselves as the leaders in this particular market. In the past few days the price of these units has risen from around 70s. (which was at the time a peak), to 75s. 6d. The yield is still high but the thought that there may be a fall in dividend this year does not deter the buyers.

In the same time KUALA LUMPUR ordinary have gained around 2s. to 24s. 6d. The return here is around 14% and last year earnings were not sufficient to meet the full dividend payment. HIGHLANDS AND LOWLANDS have crossed the 5s. mark and now stand at 5s. 6d., a rise of 1s. or so.

PATALING ordinary have also been in demand following a very encouraging report which showed a further improvement in the group's already outstanding liquid position. The ordinary shares are currently quoted at 5s. 6d. which compares with a low point for the 1958/59 period of 3s. 9d. The company's rubber output showed a rise of around 1,300,000lb. to a peak of 12,100,000 in the year just ended and is expected to rise to 14,500,000 during the current year and to increase to around 20,000,000lb. in the next five years.

LINGGI PLANTATIONS were also a firm market after the full report. Again the liquidity position revealed by the balance sheet was the main factor behind the buying. Although there has been some deterioration in current assets, and included in them, a tailing off in cash and investments, the position is still one of immense strength. Current assets of £853,000 contrast with fixed assets of £785,000 and go against £417,000 of liabilities.

A further influence in the buying of Linggi was the profit figures of the OIL PALMS OF MALAYA concern in which Linggi has a 46% interest. Oil Palms' profits were a good deal better than expected and showed only a slight fall from £243,000 to £223,000.

The interest in leading rubber shares is certainly stimulating the activities of the take-over bidder who has been exceptionally prominent in the past few weeks.

To say that there are currently twenty rubber concerns engaged in fighting off an unwanted bidder, or accepting the advances of a welcome financier or in the process of announcing a bid would be a gross underestimate of the true position.

Many of the smaller concerns have an excess of cash assets or rich properties from the point of view of land values. Obviously this type attracts the unwanted take-over specialist. Others have the right type of land to justify replanting but because of undercapitalization and the near impossible task of raising new cash they cannot carry out the needed development of their estates, and it is this type which is being absorbed slowly but surely by the bigger units who have the cash and the necessary technical resources at their disposal.

Here is a brief review of the bids and deals activity of the past few weeks: ALEXANDER AND ENGEL announced that the offer to acquire the issued capital of LOWER PERAK RUBBER had become unconditional. KEPONG (MALAY) is offering to acquire all the issued ordinary of BUNTAR RUBBER ESTATES on the basis of one share in Kepong for every two Buntar shares plus 2s. 6d. in cash. The offer was attractive when the news was originally announced, but since then there has been a rise in Kepong units and now it is exceptionally generous.

PORT DICKSON-LUKIT RUBBER has received acceptances in excess of 85% from its offer to acquire the ordinary of the SENDAYAN (FMS) RUBBER group.

MUTUAL ASSOCIATES offered to acquire the 8% cumulative preference and ordinary shares in MAMBU (FMS) rubber for 20s. and 15s. respectively. The bid was made on behalf of clients who were already substantial holders. However, the board of Mambau reacted very quickly. They told shareholders to take no action until they had received a further communication from the directors. Later it was announced that the directors urged rejection of the bid on the grounds that trading had improved sufficiently to warrant a higher dividend.

Factory Report Forms Revised

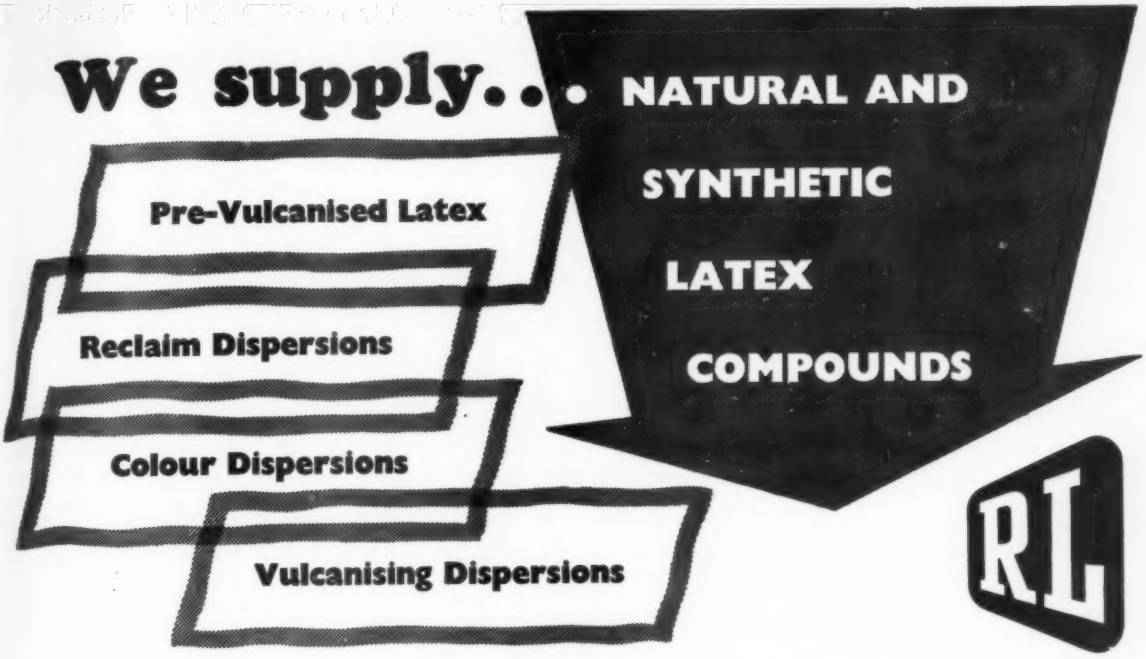
The Building (Safety, Health and Welfare) (Amendment) Regulations, 1958, which came into operation on January 1, have necessitated amendment of the Register (Form 91, part I) prescribed by the Minister of Labour and National Service for keeping reports of inspections of lifting appliances and stability of cranes, etc.

The revised Register (Form 91, Part I) in use from January 1, may be purchased from H.M. Stationery Office or through any bookseller, price 1s. 9d. (postage 4d.).

Considerable alteration of the form of certificate of test and examination of a crane (Form 96) has also resulted. The form has been arranged so that if a crane has a variable radius, the test load and the safe working load will have to be shown in relation both to the radius and the length of the jib.

The revised Form 96, in use from January 1, is obtainable from H.M. Stationery Office or through any bookseller, price 2d. (postage 2d.).

Mr H. F. Wilson and Mr C. L. G. Fairfield have been appointed directors of Submarine Cables, which is jointly owned by Siemens Edison Swan and the Telegraph Construction and Maintenance Co. They are directors of Telegraph Construction and Maintenance and have been appointed as nominees of that company.



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The ANALYSIS of RUBBER AND RUBBER-LIKE POLYMERS

☆

R.A.B.R.M. MANUAL No. 3

By WILLIAM C. WAKE
M.Sc., Ph.D.(Lond.), F.R.I.C., F.I.R.I.
HEAD of CHEMISTRY DIVISION
RESEARCH ASSOCIATION of BRITISH RUBBER MANUFACTURERS

THE first modern work devoted solely to this important subject to be published in the English language. In addition to the analysis of natural and synthetic rubbers, the author deals with rubber-like plastics such as Polyethylene, PVC, PVDC, PVA and Urethanes. Also discussed are the identification of compounding ingredients used in the manufacture of rubber and rubber-like polymers.

It will unquestionably become a standard work and is a "must" for all analysts interested in this subject.

CONTENTS:

Extraction Procedures - Qualitative Analysis for Polymer Type - Elemental Analysis of Extracted Polymer - Direct Determination by Functional Group Analysis - Solution and Dissolution Methods - Quantitative Cracking and Distillation Methods - Carbon Black in Rubber - Ashing, Wet and Dry, and the Determination of Trace Metals - Analysis of Extracts and Blooms - Statistical Aspects of Analytical Work.

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Rubber Markets

LONDON

After early dullness, a fresh rise has been recorded in the London rubber market during the week and further gains of around a farthing per lb. have been scored. The biggest rises have been secured by nearby positions and the Spot is ⅜d. higher at 26⅞d. per lb. The fresh advance reflected a general all-round demand and higher Eastern advices, the advance being based on expectations that consumption of rubber will rise but that production will be little changed.

Latest prices are as follows:

No. 1 RSS Spot: 26½d.-26⅝d.

Settlement House:
April 26½d.-26⅝d.
April/June 26⅝d.-26¾d.
July/September 26¾d.-26⅞d.
October/December 26⅞d.-27d.
January/March 26⅞d.-27⅛d.

No. 1 RSS cif basis ports:
April 26¼d.-26½d.
May 26¼d.-26½d.

Godown:
March 89⅝ Straits cents nominal.

Latex

Centrifuged latex per gallon in drums, March/April shipment, 15s. 7d. seller, cif European ports. Spot, seller, 15s. 10d. Bulk, seller, 15s. 9d. Creamed, seller, 15s. 1d. Normal, seller, 11s. 9d.

SINGAPORE

The market opened around the previous closing levels on March 16 and ruled quiet until the late morning when good buying interest, particularly for April Nos. 2 and 3 RSS, steadied the market. The trend was steady throughout the afternoon with good trade buying and short-covering. There was some profit-taking at the higher levels, but all liquidation was well absorbed with buyers unsatisfied at the close. After-hours, the market was steady.

	Straits cents per lb., fob Malayan ports to open ports	
	Close	Previous Close
No. 1 RSS, April	89½—89¾	88⅜—88⅝
May..	90¼—90½	89 —89¼
No. 2 RSS, April	88¼—88½	86¾—87¼
No. 3 RSS, April	87½—88	86¼—86⅜
No. 4 RSS, April	86½—86¾	85 —85½
No. 5 RSS, April	84½—85¼	83½—84
No. 1 RSS, Spot..	88¼—88½	87⅜—87⅞
No. 3 blanket, thick remilled, April	84 —86	83½—85½
No. 1 fine pale crepe, April ..	90½—92½	89½—91½
2X thin brown crepe, April ..	82¾—83¼	82 —83

Tendency: Steady

The Industrial Syndicate quote latex, native produce, 60% centrifugal, packed in rec. drums fob at 176.40d. per gallon.

NEW YORK

The following prices ruled in New York on March 16:

Dealers' Prices

	US cents per lb. Mar. 16	Previous
No. 1 RSS, Mar.	31½b–31⅝a	31½b–31⅝a
Apr.	31½b–31⅝a	31½b–31⅝a
No. 2 RSS, Mar.	31½b–31⅝a	30⅝b–31½a
Apr.	31½b–31⅝a	30⅝b–31½a
No. 3 RSS, Mar.	31⅜b–31⅝a	30⅝b–30⅞a
Apr.	31½b–31⅝a	30⅝b–30⅞a
No. 1 RSS, Spot	31½b–31⅝a	31½b–31⅝a
No. 3 amber blanket crepe, May	29⅞b–30a	29½b–29¾a
No. 1 latex, thin crepe, March	31⅞b–31⅞a	31⅜n
No. 1 latex, thick crepe, March	31½n	31⅜n

Futures—Rex Contract

	US cents per lb. Close	Prev. Close
March ..	31.40b–31.50a	30.85b–30.95a
May ..	31.55b–31.60a	31.10b–31.25a
July ..	31.55b–31.65a	31.15b–31.30a
Sept. ..	31.60b–31.65a	31.20b–31.30a
Nov. ..	31.60b–31.65a	31.25t
Jan. ..	31.60b–31.65a	31.15b–31.25a
March ..	31.60b–31.65a	31.25t

Sales: 36 Tendency: Firm

Rubber futures were firm on trade and commission house buying in fair dealings on March 16. Traders said Russian buying in London aided foreign markets. Factories were moderate buyers of physical rubber with shipment offerings well absorbed by dealers. The undertone of physicals were steadier.

Crepe Rubber

The following prices ruled in New York on March 11:

Dealers' selling prices:	Cents per lb.
Sole crepe, standard grade 'A'	46 (48)
Thick crepe	33¼ (32¼)

AMSTERDAM

The Amsterdam rubber market ruled as follows on March 16:

	Guilders per kilo Mar. 16	Previous
March	2.51½	2.50
April	2.52	2.51
May	2.52½	2.51
June	2.53	2.51
April/June	2.53	2.52½
July	2.55	2.53½
August	2.55	2.53½
September	2.55½	2.53½
July/September ..	2.55	2.53½

Sales: 30 Tendency: Very steady

DJAKARTA

A steady trend prevailed on March 16. Sheet offerings were scarce owing to transport difficulties. Improved demand for crepe was noted. Export certificates were quoted at 332 sellers.

	Rupiahs per kilo Mar. 16	Prev.
Spot No. 1 Priok ..	23.05b	23.05b
Spot No. 2 Priok ..	22.30b	22.30b
Spot No. 3 Priok ..	20.80b	20.75b
No. 1 fine pale crepe ..	21.75b	21.75b

Tendency: Quiet

BANGKOK

No. 1 RSS

The price for No. 1 RSS, at Bangkok on March 16 was 28.87½ (29.00) US cents per lb.

CEYLON

No. 1 RSS

The price for No. 1 RSS, spot, at Colombo on March 16 was 111 (109/110) Ceylon cents per lb.

CANADIAN RUBBER CONSUMPTION

Canadian rubber industry is reported to be doing better this year reflecting an increased number of new 1960 auto models produced. However, in the year 1958 consumption of rubber (all kinds) eased as compared with the previous year. According to official figures, consumption of rubber (natural, synthetic and reclaim) in Canada during 1958 declined 5.3% to 221,600,000lb. from 233,977,000 in 1957; natural declining 9.2% to 83,072,000 (91,477,000lb.), synthetic 1.7% to 104,654,000 (106,491,000lb.) and reclaim 5% to 33,874,000 (36,009,000lb.).

Natural rubber consumed in the year accounted for 37.5% of the total compared to 39.1% in 1957; synthetic for 47.2 (45.5%) and reclaim for 15.3 (15.4%). During the month of December, the consumption of all rubber increased 22% to 21,267,000 (17,424,000lb.). Natural rubber consumed climbed 25% to 8,415,000 (6,730,000lb.), synthetic 21% to 9,649,000 (7,987,000lb.) and reclaim 18% to 3,203,000 (2,707,000lb.).

The month's consumption of all rubber used in the manufacture of tyres and tubes rose to 15,152,000lb. from year-earlier total of 11,852,000; in footwear to 1,398,000lb. from 1,369,000 and in all other products to 4,193,000lb. from 3,642,000. The amount used in the output of wire and cable declined to 524,000lb. from 561,000.

Stocks of natural rubber at December 31 amounted to 4,467 long tons, compared with 4,297 tons at end of previous month and 4,542 tons at December 31 1957; synthetic stocks amounted to 10,351 long tons against 8,787 end of November 1958 and 8,788 tons year before. Reclaimed stocks amounted to 1,400 tons against 1,423 and 1,383 tons respectively.

Domestic production of synthetic in December amounted to 12,951 tons compared to 12,133 tons in previous month and 11,253 year ago. Reclaimed production amounted to 594 tons compared to 608 and 495 tons respectively.

Industry INTELLIGENCE

Technical Data

Carbon Black in Butyl Rubber

An investigation of the effect of different types of carbon black in Polysar Butyl 301 is reported by W. D. Gunter in Polysar Technical Report No. 7:11A, distributed in the UK by Polymer (UK) Ltd., Walbrook House, Walbrook, London, E.C.4. Four types of carbon black were used, namely, FEF, HAF, MT and EPC blacks. In one series of tests, each black was used in a proportion of 70 phr, an additional mix being included containing a mixture of 35 phr of MT black and 35 phr of EPC black. For the other series of tests, FEF black only was used, and was added in proportions of 30, 50, 70 and 100 phr. Data are given for the Mooney viscosity, Mooney scorch time and extrusion properties of the unvulcanized compounds and for the following properties of the vulcanizates: hardness, modulus at 100% and 300% elongation, tensile strength, elongation at break and compression set. Data for heat ageing in air and for ozone resistance are included. In addition to the complete test results, a summary is presented indicating the major effects of the different blacks and the different loadings of the FEF black on the properties of the Polysar Butyl 301 compounds.

Dry Colouring of Polythene

While 'Alkathene' may best be coloured by the conventional methods of mixing together colouring matter and polymer on heated rolls or in other suitable equipment, there are some applications where complete uniformity of shade is not essential. In these cases the dry colouring technique may be employed. This consists in weighing out quantities of 'Alkathene' and the colouring matter into a steel drum or conical mixer and tumbling until each granule of 'Alkathene' has become evenly coated with pigment. The procedure is described in I.C.I. Technical Information—Dyehouse No. 463.

The leaflet contains a list of I.C.I. pigments suitable for colouring 'Alkathene' by this process. Mouldings were made from the coloured polythene and were tested for light fastness, heat stability and 'blooming' of the colour. Only colours that showed no tendency to bloom have been included. Results of the tests for light fastness and heat stability are given in the leaflet.

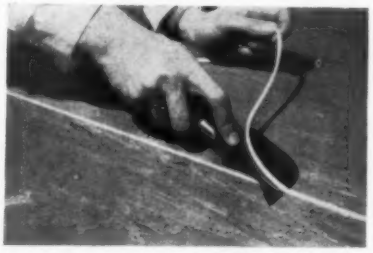
Santoflex HP

Santoflex HP is a blend of two antioxidants, namely phenyl-beta-napthylamine and N,N^1 diphenyl-para-phenylene diamine. It confers good resistance to both heat ageing and flex cracking of natural rubber and SBR, while it inhibits the deleterious effect of contamination of natural rubber with small proportions of copper and manganese. Data demonstrating the antioxidant properties of Santoflex HP in natural rubber and SBR are presented in Laboratory Report No. LA1/1, issued by Monsanto Chemicals Ltd., Monsanto House, 10-18 Victoria Street, London, S.W.1. A tyre tread stock containing 50 phr of HAF black was used and samples with and without Santoflex HP were submitted to heat ageing and flex cracking tests. In addition, a copper contamination test was made with the natural rubber stock and a heat ageing test was made with an oil-extended SBR stock, the latter containing 60 phr of HAF black. In all the tests, the incorporation of Santoflex HP in the mix resulted in a marked improvement in the resistance of the compound to heat ageing and, when tested, to flex cracking.

Machines, Materials and Equipment

Welding Vinyl Floor Coverings

A new method of welding together lengths of MarleyFlor or similar vinyl floor covering has been developed by the Marley Group, Sevenoaks, Kent. A special technique, with a special kit



of tools, has been evolved. The floor covering is laid with a gap of 1in. to 3/16in. The seaming rod—at this stage it is circular in section—is fed into the gap on a wheel while hot air is directed on to it. This plasticizes the rod which is pushed firmly and neatly into the gap and welds itself to the floor covering on each side. The rod is then shaved flat and level, resulting in an unbroken expanse of floor covering. To insert the strip across the grain, or elsewhere than between two lengths, the floor covering is routed out with a special chamfering plane, and the seaming rod inserted as before. This is particularly useful for adding decorative features, or for marking out permanent lanes and so on to direct foot traffic, border off display areas, and the like. The seaming strip is being made in colours that contrast or blend with the range of sheet vinyl floor coverings.

Belt Dressing Compound

A belt dressing compound known as 'Sprazon,' is being supplied by Graton and Knight Ltd., Warwick Road, Boreham Wood, Herts., for use on leather, rubber or textile belts. This compound is supplied packed under pressure in 12oz. containers incorporating a lever-operated spraying device which enables a controlled amount of liquid to be quickly and easily applied to belts even when they are in relatively inaccessible positions.

Publications Received

Motor Control Centres

Motor Control Centres manufactured by the Igranic Electric Co. Ltd., Bedford, are described in a pamphlet recently issued by the company.

Data Collection

The Results of the Dechema Exchange of Experience ('Die Ergebnisse des Dechema - Erfahrungsaustausches') are described in a pamphlet which may be obtained free of charge from the Dechema, Frankfurt (Main) 7, Postfach, Germany.

The object of this work of reference is to collect data obtained in research work and descriptions of new developments which have appeared in the literature as well as widely scattered practical experience and then to sift and classify such information so as to make it available to chemists and engineers engaged in science and industry in a systematic and concise form. Among the subjects already dealt with in serial editions are laboratory techniques, chemical engineering flow sheets and works techniques.

Rubber Footwear

The revolution in the footwear industry caused by the introduction of rubber during the last century is described in a new Dunlop publication 'Making Footwear with Rubber.'

The first rubber overshoes were manufactured during the middle of the last century by Chas. Macintosh and Co. (now a Dunlop Company) of Manchester, who received an award for them at the Great Exhibition of 1851. Subsequent developments in the rubber footwear industry are outlined in the booklet, which also gives a detailed and excellently illustrated account of modern manufacturing processes. It is one of a series which can be obtained from the Educational Section of the Dunlop Public Relations Department at St. James's House, St. James's Street, London, S.W.1.

Export Opportunities

Plastics Laminae for Manufacture of Venetian Blinds for Western Germany

John Vieweg and Co., Bremen, Paschenburgstr. 52, have advised the British Consulate at Bremen that they wish to receive quotations from United Kingdom manufacturers for plastics laminae required for the manufacture of Venetian blinds. The quantity required is 10 million metres.

Manufacturers interested in this enquiry should write direct to John Vieweg and Co., and should notify the British Consulate, Commercial Section, Bremen, Am Wall 102, that they have done so. Board of Trade Reference: ESB/5337/59.

Rubberized Trouser Waistbands for Union of South Africa

Maritime Agencies (Pty) Ltd., P.O. Box 8090, Johannesburg, have informed the UK Trade Commissioner at Johannesburg that they would like to represent on a commission basis, a United Kingdom manufacturer of rubberized trouser waistbands. A sample of the type of waistbands the Johannesburg firm wish to handle is available.

Manufacturers interested in this agency enquiry should write direct to the South African concern, and should notify the UK Trade Commissioner, P.O. Box 10101, 52 Pritchard Street, Johannesburg, that they have done so. Board of Trade reference: ESB/3095/59.

Vinyl-Asbestos Floor Tiles for British East Africa

The Anglo-Baltic Corporation Ltd. of P.O. Box 200, Nairobi, have told the UK Trade Commissioner at Nairobi that they are interested in acquiring an agency for vinyl-asbestos floor tiles. As an indication they say that they are looking for a tile of a thickness of approximately 0.75 gauge which the manufacturers could offer at about Sh: 8/- per sq. yd. cif Mombasa. The Nairobi company would be glad to receive samples. Anglo-Baltic Corporation Ltd. are not interested in dealing with a factor or export house but only direct with manufacturers.

Manufacturers interested in this agency enquiry should write direct to the Anglo-Baltic Corporation Ltd., and should notify the United Kingdom Trade Commissioner, P.O. Box 30133, Memorial Hall, Nairobi, Kenya, that they have done so. Board of Trade Reference: ESB/4907/59.

The address of the Export Services Branch of the Board of Trade is Lacon House, Theobalds Road, London, W.C.1. Telephone number: Chancery 4411, extensions 776 or 866.

Mr Alan H. Marshall has been appointed a director of Kepong (Malay) Rubber Estates.

Future Events

INSTITUTION OF THE RUBBER INDUSTRY

London Section.—Tuesday March 24 at the Criterion, London, W.1, at 6.30 p.m. 'Test Tube to Tyre,' by J. Mason, A.I.R.I., Monsanto Chemicals Ltd.

Manchester Section. — Monday March 23 at the Grand Hotel, Manchester, at 6.45 p.m. 'Protection of Rubber and Some Plastics against Ageing and Weathering,' by Dr W. McG. Morgan, Monsanto Chemicals Ltd.

PLASTICS INSTITUTE

Members of the Plastics Institute are invited to attend the March 24 meeting of the London Section, Institution of the Rubber Industry.

PATENT LIST

Printed copies of the Specifications in the following list can be obtained from the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, price 3s. 6d., including postage, but about six weeks after the date of this publication will usually elapse before they come available. Orders with remittance may be sent in advance to the Patent Office, and will be fulfilled immediately the Specifications are published.

COMPLETE SPECIFICATIONS ACCEPTED

Open to public inspection on March 11 1959

Colts Plastics Co., Inc. Slotting tool and associated parts for a box blank forming machine. June 3 1957. 810,257.

E. Breitenborn. Cushioned support composed of foamed plastic for chairs, sofas, mattresses and the like. December 14 1956. 810,252.

Dow Chemical Co. Coating process for polyethylene and composite articles thereby obtained. 810,169.

Goodyear Tire and Rubber Co. Process for producing sheet material. 810,331.

Imperial Chemical Industries, Ltd. Esters of aminoacids. 810,332.

Chemische Werke Albert. Epoxide resins. 810,230

Midland Silicones Ltd. Resins. 810,284.

Farbenfabriken Bayer A.G. Hardenable synthetic resinous compositions. 810,222.

E. I. du Pont de Nemours and Co. Methods for controlling the degree of polymerization in the polymerization or copolymerization of ethylenically unsaturated monomers. 810,268.

T.I. (Group Services) Ltd. Production of bodies of plastic. 810,041.

Imperial Chemical Industries Ltd. Polymerica materials. 810,025.

Midland Silicones Ltd. Process of curing siloxane resins. 810,283.

Astra Apothekarnes Kemiska Fabriker A.B. Method for the preparation of aminoacyl anilides. 810,212.

Firestone Tire and Rubber Co. Tubeless tyre and rim. 810,125.

TRADE MARKS

Objections to the registration of any of undermentioned applications may be lodged the Comptroller-General of Patents, Dis Trade Marks at the Patent Office, 25 S ton Buildings, Chancery Lane, London, W within one month of the date mentioned objections must be stated on Trade Mark No. 7, cost £2, obtainable through any order office. The extracts—from 'The Marks Journal'—given below are repr by permission of the Controller of Stationery Office.

TERMOSAC (772,539) For tainers included in Class 16 principally of paper or of paperb or of combinations of paper or paperboard with metallic foil and of thermoplastics. By the Organisa Internationale du Thermosac SC, Forelstraat, Ghent, Belgium. Addr for service is c/o Bromhead and St. Paul's Chambers, 19/23 Ludg Hill, London, E.C.4. To be associ with No. 772,537 (4202, 94) and other. (Class 16; February 25 1959.)

PLYKOTA (B775,098) For arti included in Classes 16, 18, 19, 20 27, coated with plastics. By W Cornice Pole Co. Ltd., 20 Princ Street, Manchester. To be associ with No. 775,099 (4207, 230). (C 16, 18, 19, 20 and 27; February 1959.)

VISTATHENE (783,684) For wr ping and packaging materials mad films of polythene plastics and includ in Class 16. By British Cellophan Ltd., Bath Road, Bridgwater, Somer (Class 16; February 25 1959.)

FABLON (780,221) For all goo included in Class 19 made wholly plastics. By Commercial Plastics L Willington Quay, Wallsend-on-Ty Northumberland. To be associ with No. 674,747 (3744, 21) and other. (Class 19; February 25 19

Increases of Capital

Provincial Tyre Co (South W Ltd. (543,649), 781 Salisbury Hou London Wall, London, E.C.2.—I creased by £1,000, in £1 ordin shares, beyond the registered cap of £5,000.

Eastwood Plastics Ltd. (552,7 7 Great Winchester Street, Londo E.C.2.—Increased by £9,000, in ordinary shares, beyond the registe capital of £1,000.

Rubber Regenerating Co. L (104,945), First Avenue, Trafford P Manchester, 17. — Increased £440,000, in 1,756,000 ordinary 4,000 management shares of 5s. e beyond the registered capital £1,100,000.

Thomson Tubes Ltd. (616,47 manufacturers of plastics and glass materials, etc., Winchester Ho Old Broad Street, London, E.C.2. Increased by £49,900, in £1 ordin shares, beyond the registered capital £100.